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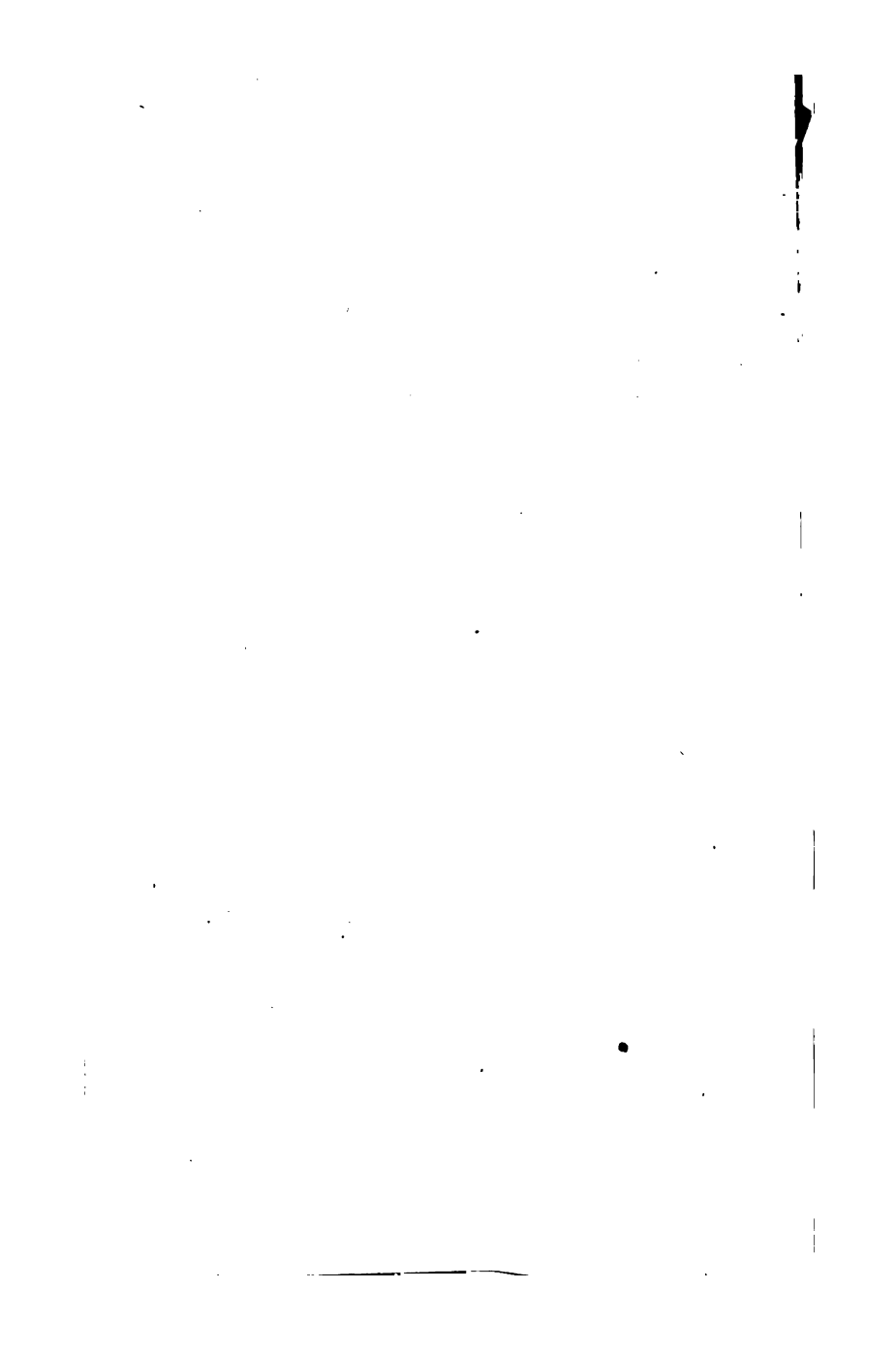
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THE NEW CODE, 1871.

THE
USEFUL KNOWLEDGE
READING BOOKS

ADAPTED TO

THE USE OF BOARD-SCHOOLS AND
OTHERS UNDER GOVERNMENT INSPECTION.

BY THE

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EDITORS OF 'THE GRADE LESSON BOOKS' &c.

GIRLS' FIFTH STANDARD.

LONDON:
LONGMANS, GREEN, AND CO.
1878.

THE EDITORS venture to call the attention of Teachers and Managers of Schools to their

INTRODUCTORY LESSON BOOK,

embracing **READING, WRITING, and ARITHMETIC**, as preparatory to the First Standard under the New Code, 1871.

They also beg to refer to their series of

GRADE LESSON BOOKS,

especially adapted to the New Code, 1871, and embracing **READING, SPELLING, WRITING, and ARITHMETIC**.

These books will be found very suitable for use alternately with the **USEFUL KNOWLEDGE SERIES**, as required by the Committee of Council on Education.

They are also specially adapted as Home Lesson Books in all the essential subjects of the Code Examinations.

The Editors beg to draw the attention of Teachers to the notice on page viii.



ADVERTISEMENT
TO THE
FIRST EDITION
OF
USEFUL KNOWLEDGE READING BOOKS.

SERIES FOR BOYS.
SERIES FOR GIRLS.
IN SIX STANDARDS EACH.

THE EDITORS of these Series have been led to undertake their production by the fact that, for our Elementary Schools, there is an acknowledged want of books combining facility in teaching to read with the inculcation of such useful knowledge as is calculated to prepare the young to enter upon the practical duties of life with intelligent and well-furnished minds.

In attempting to produce such a work, the chief difficulty is that of supplying useful knowledge in a form sufficiently attractive,

and so suited to the capacities of children as to awaken their interest and excite in them a thirst for knowledge; in truth, to effect a threefold object, namely, to teach them to read, to cultivate in their minds a love of reading, and, at the same time, to impart sound and useful instruction in those matters relating to every-day life, *for which no special times can be set apart in the daily routine of an elementary school.*

Hitherto this difficulty has seemed insuperable; and this has led to the production of books addressed almost exclusively to the imagination—the moral and emotional nature of children—to the almost total omission of subjects of practical utility.

Although it must be allowed that a very gratifying degree of success has attended the use of such books, and it cannot be wished that they should be superseded, as they certainly fulfil a very important office in the training of the children in elementary schools, the Editors believe it is generally felt by all thoughtful friends of elementary education, that the school means of training the young will be very insufficient, unless, in addition to books of this class, others be supplied which shall afford more practical information. Also, it is found in the working of a school that a double set of reading-books is very advantageous, and teachers will readily confess that the benefit derived from an occa-

sional change of books more than counter-balances the slight additional expense which is entailed.

The great difficulty, however, which has been mentioned above, has not, as far as the Editors' knowledge extends, hitherto been overcome.

For the most part, those reading-books which aim at giving useful information to their young readers, have failed in presenting what is attractive and interesting, and adapted to the minds of children. The present Editors believe that this comparative failure may be explained partly on the ground that the books are written rather by theorists than by persons practically acquainted, as teachers, with the minds of children, and partly that the extracts are taken from writers whose ideas and language fly far above their heads; while not unfrequently too many lessons are prepared by the same hand, and thus the books acquire a monotonous and wearisome character.

A further mistake in such books has been made by the introduction of subjects involving technical teaching, which the Editors feel sure can be imparted effectually only through manuals specially treating the several subjects.

The Useful Knowledge Reading Books, therefore, aim chiefly at giving information that shall be valuable in itself, and that shall also lay a firm basis for any special technical

education that may be afterwards entered upon. This foundation will best be laid by imparting to boys, whose livelihood must be drawn from the soil, some knowledge of its products and of the method of dealing with it; and by supplying, in the case of girls, as far as books can do, the immediate and indispensable need of a real and solid acquaintance with the practical matters involved in the management of a home. It is, further, obvious that much information may be given of the uses to which agricultural and mineral products may be put without entering into technicalities; and in this respect it is hoped the present series will not be found wanting.

The Editors of the Useful Knowledge Reading Books sincerely desire that they may not be misunderstood in these remarks. They make them in no captious spirit, but merely as explaining the difficulties in the way of producing a really suitable series of Useful Knowledge Reading Books; and as indicating the causes of the defects which are admitted by practical persons to prevail in most existing books of the kind.

In determining, therefore, the principles which should guide them in the production of these series, the Editors set before themselves the following points, and have done their best to carry them out:—

1. The lessons contained in the books must

impart *useful knowledge*, including in this moral teaching.

2. They must be concise, yet comprehensive.

3. They must have variety and attractiveness in style, and be level with the capacities of the children for whom they are intended.

4. They must not treat of subjects technically, technical teaching being inappropriate to such books, and above the capacities of the children for whom they are intended.

5. Looking at the fact that the pursuits and interests of girls are, for the most part, different from those of boys, although they have much in common, *it would be useful and desirable to present a series drawn up especially for girls.* (This series, the Editors hope, will be considered particularly valuable, presenting, as it does, the results of the experience and knowledge of those who, *having devoted their time and talents to the training and management of the young of their own sex*, must be peculiarly, and it may be almost said exclusively, qualified to produce lessons suited to the wants and capacities of girls.)

6. To carry out the idea, many coadjutors must be obtained specially qualified for the work.

The Editors, feeling assured that schoolmasters and schoolmistresses actually engaged in teaching the young are best qualified to

write lessons calculated to interest boys and girls, and adapted to their capacities, appealed therefore to many teachers of approved ability to aid them in this important work—an appeal which, they are thankful to say, has been responded to in the best spirit; and they have great pleasure in announcing that they have been assisted in the work in hand by some of the best educated and most experienced of the trained and certificated masters and mistresses of elementary schools, and have also received the kind aid of personal friends connected with educational work. With such invaluable help, they have been able to produce two series of books—one for Boys and another for GIRLS—which they hope will thoroughly meet the wants of the classes for whose instruction they are intended.

NOTICE TO TEACHERS.

The Committee of Council on Education now require that each School subject to Inspection shall be provided with TWO COMPLETE SETS OF READING-BOOKS, and that the children presented for examination shall show an acquaintance with the SUBJECT MATTER of the Lessons contained in their respective standards.

Her Majesty's Inspectors require, in Schools where singing is not taught from notes, that the children shall be able to sing at least six songs from memory, with correct words, tune, and time. The Editors have therefore inserted, in each Standard of this Series, several pieces of poetry, which have been set to music, in order that the children may have the means of learning the words correctly before they are taught to sing them.

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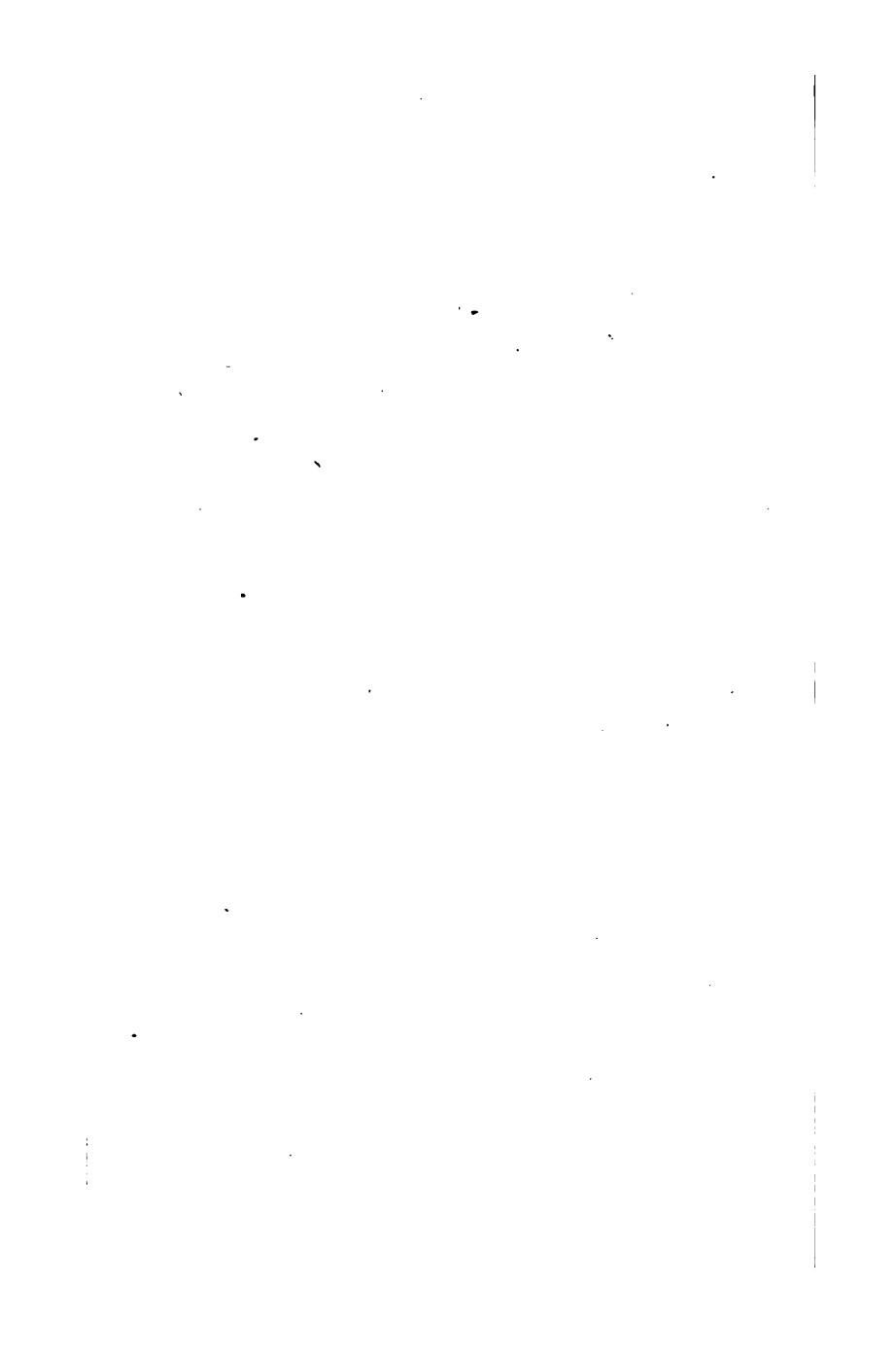
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THE
USEFUL KNOWLEDGE READING BOOKS.

STANDARD V. (GIRLS' SERIES.)

ELIZABETH FRY.

ex-cel', *to be the best*
be-nev'-o-lence, *kindness to others*
con-fu'-sion, *disorder*

con-demn'-ed, *sentenced as guilty*
drear'-y, *dull; cheerless*
squal'-or, *misery*

‘Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints in the sands of time.’

THE words of Longfellow which refer to ‘great men’ may, with equal truth, be applied to great women also. ‘But,’ you will ask, ‘how can a woman be great?’ The *good* alone are truly great; and in goodness every woman and every girl should seek to excel. There have been some good women whose names should be known to every girl, and whose example every girl should try to follow. Amongst them we find that of Elizabeth Fry, whose benevolence made her worthy of our warmest admiration.

Elizabeth Fry was born near Norwich about a hundred years ago, and was one of a family of twelve children. In her beautiful home on the banks of the Wensum all her early years were passed. There, we may be sure, she saw nothing of the sin and

misery which she afterwards spent her life in trying to check.

When Elizabeth was twelve years old, it pleased God to take away her best earthly friend—her mother. This great loss, no doubt, had some effect on her education; for, at eighteen, she seems to have been much given to gaiety and pleasure. Then, however, her thoughts took a new turn; and one of the first acts of her public benevolence was to rescue a poor little boy from poverty, ignorance, and perhaps vice. This little wanderer proved the first of many who found shelter, food, and instruction under the kind care of Elizabeth Fry.

But a greater work was yet in store for her. On visiting for the first time the Newgate prison, it made her kind heart ache to see the state of the prisoners there. Crowded together in two wards were nearly three hundred women, some condemned to death, and others untried and perhaps innocent. Little children, too, were there, learning fresh vices from those who were older in sin. Nothing but filth, wretchedness, and vice met the pitying eye of the visitor. To spend the rest of her life in reforming such prisoners was the first wish of Elizabeth Fry. To do them any good she knew that it was necessary to make them feel that she really cared for them, and was willing to give up her own comfort for their benefit. At her own earnest request, therefore, but against the governor's advice, she visited them alone and quite unprotected.

Then it was that for the first time those wretched prisoners felt the power of kindness. They received her proposal to form a school for them with tears of joy. With the help of some other ladies, a school was formed within the dreary walls of Newgate. Where nothing but oaths were once heard, voices might now be heard learning to read. Needlework

was to be found in hands once idle, and order and cleanliness took the place of squalor and confusion. A change so great aroused the attention of those in authority to the subject of prison reform. The good results of this may now be seen by visiting our prisons—results largely brought about by the untiring zeal of one good woman.

‘But,’ perhaps some little girl will say, ‘I cannot do as Elizabeth Fry did.’ Perhaps not, but to a certain extent, in your own little sphere, you may follow in her footsteps. You can use the law of kindness as she did, and try to lead your brothers and sisters and companions to give up what is wrong by gentle, not by harsh means. You can follow her example in giving up her own comfort for the good of others, and her reward will be yours. She left this world with a peaceful smile on her face, and on her lips the words: ‘It is a strife; but I am safe.’

H.

SAVINGS' BANKS.

bar-om'-e-ter, <i>an instrument for measuring the weight of the air</i>	in'-ter-est, <i>money paid for the use of money</i>
con-tin'-gen-cy, <i>an accident</i>	prin'-ci-pal, <i>money lent</i>
cur'-rent (adj.), <i>running on</i>	in-vest', <i>to place money out at interest</i>
sur'-plus, <i>something to spare</i>	fluc-tu-a'-tion, <i>a flowing backwards and forwards, constant change</i>
be-ne'-vo-lent, <i>wishing well to others</i>	with-draw', <i>to take away</i>
com-mu'-ni-ty, <i>a number of people living together</i>	gra-tu'-i-tous-ly, <i>free of charge</i>
ac-cu'-mu-lat-ed, <i>heaped up, collected</i>	

ONE morning last summer I saw a man who was preparing for a long journey. He looked at the barometer—it was falling—then he glanced at the sky

—the clouds were lowering. Next he watched the clouds to see whence the wind was blowing—south-west; then turning quickly to his daughter he said, ‘Polly dear, fetch me my umbrella and macintosh.’ This man was making provision for the future, ‘preparing for a rainy day.’ Now what he was doing in regard to the weather, all persons should do in regard to their future bodily wants. In a word, they should remember that the time may come when, from sickness or old age, they will be unable to work; and that, if no provision be made for these contingencies, distress and suffering will be the result.

To make provision for future wants, some portion of the earnings of the present time should be saved. Now, in order to effect a saving, it is necessary that the current expenses be kept below the current receipts, and further that whatever is the amount of the surplus it should be deposited in some safe place. Such a place is found in what are called Savings’ Banks.

It was not until the commencement of the present century that the working classes had a proper place of deposit for their spare funds. About the year 1805 it occurred to some benevolent persons that an important benefit would be conferred upon the working classes if there were institutions of the character of banks in which the poorer members of the community might deposit the smallest sums they could spare, certain of being able to draw them out when they needed them, with accumulated interest. This led to the establishment of Savings’ Banks, first in England, and afterwards in Scotland and Ireland.

At first these banks were carried on by mere private security, but after a time, when millions of money had found their way into them, the government took the matter up, and an Act of Parliament

was passed by which the security of the nation itself was given for the funds deposited. This Act directs that all the funds deposited in National Savings' Banks must be paid into the Bank of England on account of the government, and that the money so invested shall bear interest at the rate of 3*l.* 16*s.* 0½*d.* per cent. per annum, whatever may be the fluctuations in the value of the public funds during the time of investment. Depositors are thus afforded the best of all securities, namely, that of the whole British nation; and further, the bank is enabled to give a higher rate of interest than it could do if it were a mere private banker. The highest interest which the law allows the National Savings' Banks to pay is 3*l.* 8*s.* 5½*d.* per cent. per annum, the difference between this and the rate allowed on the money invested by them in government securities being reserved as a fund for the payment of the officials of the bank and other expenses. The rate usually paid is 3*l.* 6*s.* per cent. per annum. Deposits of from 1*s.* to 30*l.* may be received in the Savings' Bank, but no person may deposit more than 30*l.* in one year, or 150*l.* in the whole. Savings' banks have been highly successful from the date of their establishment to the present time. In the year 1840 twenty-four millions sterling had been deposited, a vast accumulation of small sums saved out of the earnings of the working classes.

A few years ago an Act of Parliament was passed authorising the Postmaster-General to establish Savings' Banks in connection with the General Post Office, the government undertaking to give its own security for the money deposited, and to allow interest at the rate of 2½ per cent. per annum. This is at the rate of 6*d.* in the pound for a year, or one halfpenny in the pound per month. But no

interest is allowed for a part of a month, nor upon a fraction of a pound.

The advantages of the Post Office Savings' Banks are very great. They are established in all parts of the kingdom; any sum from 1s. to 30l. may be deposited in one year; the deposit may be made on any day, and in any place where a bank has been opened; the money may be withdrawn whenever required, and from any Post Office Savings' Bank in the United Kingdom; the forms to be filled up for deposit or withdrawal, and the bank-book in which the entries are made, are supplied to the depositor gratuitously; and all letters that pass between the depositor and the Postmaster-General respecting money in Post Office Savings' Banks pass free of postage.

Then again, in the case of the death of the depositor without a will, no legal forms or expenses are incurred, the money deposited, if under 50l., being paid over by the Postmaster-General to those relatives of the deceased who may be entitled to receive it.

J. H.

SPICES.

ad-join'-ing, *near, adjacent*
wrest, *to take away by force*
ab-stain', *to keep from*
ac-com'-pan-i-ed, *joined with*
smug'-gled, *brought into a country*
without payment of duty
cha-grin', *annoyance*
per-fume' (v.), *to scent*
va-ri'-e-ties, *kinds*

in'-val-id, *a sick person*
fla'-vour-ing, *giving taste or fla-*
vour to a thing
spe'-cies, *kinds*
ex-tract'-ed, *drawn out*
pu-tre-fac'-tion, *decay*
ir-ri-tat'-ing, *annoying*
grat'-i-fy-ing, *pleasing*
in-sure', *to make certain*

FAR away, between Asia and Australia, there is a cluster of islands which are neither well watered

nor remarkably fertile. Indeed, the inhabitants are obliged to procure rice and other articles of food from adjoining islands. Storms and volcanic outbursts, too, are frequent in them; and yet from very early times they have been important, and civilized nations have striven to obtain possession of them. These are the Moluccas or Spice Islands. Their importance is chiefly due to the fact that, though not generally fertile, they produce in abundance those useful vegetable substances called spices.

Early in the sixteenth century the Portuguese obtained the islands and gained vast profits from the spice trade. At the beginning of the next century the Dutch wrested the islands from the Portuguese. Several times they have lost, and then regained them. They still possess some of them, while others are governed by native chiefs, who, however, are subject to the Dutch governor. The natives are not well treated. Wishing to reap all the profits of the spice trade, the Dutch ordered the chiefs to destroy all the spice trees in the islands they governed, to abstain from planting new ones, and to carry on no trade in spices with other lands. To insure obedience, fortresses were erected on different islands, and soldiers stationed in them to keep watch. But seeds had dropped from the old spice-trees, and year after year new ones sprang up, the fruit of which the natives sold whenever they had an opportunity. The Dutch governor then ordered that every year the trees should be burned down, and, in order to see that they really were destroyed and to prevent smuggling, he once a year took a voyage round all the islands, accompanied by several warships. In spite of all, the trees continued to grow and the natives to smuggle the spices, to the great chagrin of the Dutch owners of the islands.

Spices were highly esteemed by eastern nations in

early ages. Their sweet perfumes led to their use in embalming the bodies of the dead and perfuming the apartments and clothing of the rich. They were also largely used as medicines and in the preparation of savoury foods.

At the present day spices are employed for all these purposes.

Spices are of different kinds. Some are roots; others are obtained from the bark and fruit of plants. Some have a sweet taste, others are hot and bitter, and contain a portion of hot pungent oil which is considered beneficial to the health of the digestive organs.

Although spices are largely found in the Moluccas, they are by no means confined to them. Different spices are found in America, the West Indies, and other warm countries.

The principal varieties used in this country are—cinnamon, cloves, nutmegs, mace, ginger, and pepper.

Cinnamon is the dried bark of a kind of laurel which grows in Ceylon. There are two kinds: one coarse and hard, the other thin and of a pale gold colour. The bark is cut and dried in the sun, when it curls and becomes darker. The small pieces are stuffed inside the larger ones, which curl tightly round them till the whole looks like a solid rod.

Cinnamon is used as an article of daily food by the natives. Oil, which is very valuable both as a medicine and as a perfume, is obtained from the cinnamon. This oil is sometimes sold at the rate of ten guineas per pound. Cinnamon is largely used in this country in the preparation of medicine; for flavouring diet for children and invalids, and wines; and in making a strengthening kind of tea. The Chalias, or people employed in preparing the cinnamon, are little better than slaves. They wear scarcely any clothing, and are very ignorant. Overseers are set

over them who compel each of them to prepare a given quantity during the season.

Cloves are the flower-cups of another species of laurel. When the petals begin to fade, these are gathered from the shrubs by means of hooks, or by beating the plants with bamboos. The cloves are dried over a wood fire, and afterwards laid in the sun. Cloves yield a fragrant smell, and are therefore sometimes strung into necklaces, or made into tiny baskets which are laid in linen drawers and chests to perfume them. They have a hot taste and give a pleasant flavour to apple-pies and other dishes. Oil is extracted from them called oil of cloves, which is used in cases of toothache, though unwisely, as they destroy the teeth.

Nutmegs and *mace* are obtained from a very beautiful tree which grows in the Spice Islands. It bears a very beautiful fruit, inside which is a kernel, covered by a hard black shell which has a soft inner lining. This lining is the mace, the kernel is the nutmeg. In its green state the East Indians eat the kernel, but when dried it becomes hard and woody. Both mace and nutmeg are used as flavouring ingredients.

Ginger is the root of a plant found in Asia and the West Indies. The roots grow to the size of a man's finger, and are eaten as salad by the natives. They are also candied, or boiled in sugar, and thus form a delicious sweetmeat. The root is likewise dried and exported. It is one of the most useful of the spices. As a medicine it serves to restore warmth, strengthen the stomach, and relieve pain. It is largely used in the preparation of ginger wine and beer, gingerbread, and a wholesome medicinal tea, as well as in flavouring many kinds of food.

From a somewhat similar root is obtained *turmeric*

or curry powder, which is much used as a stimulating accompaniment to rice, soups, &c.

Pepper is obtained from the berries of a climbing plant called the pepper vine. The berries when dried are black, but on exposure to the sun, or soaking in water, they become light. This is done when white pepper is required.

Pepper is probably the most commonly used of the spices. Taken with animal food, it aids the stomach in the work of digestion. It also preserves flesh from putrefaction, and adds greatly to the excellence of most meat dishes. The fineness of its flavour can only be obtained by exposure to heat; hence it should be added during, instead of after, the process of cooking.

Pepper is largely employed in pickling vegetables. It is also said to form, with vinegar, a good plaster for relieving the irritating pain of tooth and face-ache.

Do you see how all things are adapted to man's use and comfort? Even such things as roots, bark, and berries giving beauty to the earth, employment to the poor, extending commerce and increasing wealth, soothing man's pain, gratifying him with pleasant fragrance, and giving relish to his food. Immoderately used, these spices are highly injurious, but taken in proper quantities they doubtless serve to improve health and comfort. How constant must be the care and love of the Great Giver of all things for us His children! Should not we praise and thank Him always for thus abundantly providing for our wants and making the wide world a store-house for us?

S. C. C.

MARKETING.

<i>va'-ry, to differ</i>	<i>ex'-tri-cate, to draw out, to free</i>
<i>de-duct', to take from, to subtract</i>	<i>in-stal'-ment, part of a sum of</i>
<i>com-bine', to unite</i>	<i>money paid at a particular</i>
<i>im-me'-di-ate, at once, without</i>	<i>time</i>
<i>delay</i>	<i>fore-stall', to take beforehand</i>
<i>ex-pend'-i-ture, amount of money</i>	<i>ad-here', to stick to</i>
<i>spent</i>	<i>re-ject', to refuse</i>

Most working people, especially those who have families, know only too well how hard money is to gain, and how easily it is spent. What was earned by six days of the father's hard toil is often quite gone when the Saturday night's purchases are made. How important it is then that the wife who is anxious to make her husband's home comfortable, so as to give him good courage to go on cheerfully in the hard struggle for a living, should do her part well! Her task is to spend what he earns. Now this seems both easy and pleasant. Many would say, 'Only give me the money and I will spend it.' Yes, it is quite true they can spend it, but the question is whether they will spend it to the best advantage, whether all the good will be got out of the money which, by care, forethought, and management, might be got.

It would be folly to say how much a working-man's wife ought to spend, or how she ought to spend it. This must depend on the amount of income, the number of persons in the family, the state of their health, whether they live in town or country, the cost of rent, taxes, coal, and children's schooling, all which expenses vary much in different places. Every housewife should consider her own circumstances, make her calculations, and, deducting the expenses named and similar ones, reckon how much remains for food and clothing. All that can

be attempted in this lesson is to give a few general rules about the purchase of common articles.

Some things are better for being kept, as, for instance, soap and candles. Soap, cut into pieces and kept for some time in a dry place, does not waste nearly so much as when it is used fresh. Other things are very perishable; vegetables and fruit are soon spoiled, so that if a considerable quantity be bought it will either be extravagantly used or wasted. Potatoes are much better fresh dug in summer, or just brought out of the pits in winter. Some kinds of meat, too, require to be used quite fresh, as lamb and veal; and in summer, when the heat and flies combine to spoil meat, no more of any kind should be purchased than is wanted for immediate use. On the other hand it is a good plan to keep beef or mutton for some days in the winter, if we have a dry cool place in which to hang it.

Many things, as groceries and drapery goods, are neither better nor worse for keeping, but an advantage both in price and weight can often be got by buying a quantity. People often lose in money, and always in weight, by purchasing odd ounces and quarter-pounds. Thus, supposing the price of a pound of tea is 2s. 3d. and sugar 3½d., the grocer will charge 2d. per oz. for the tea, which is at the rate of 2s. 8d. per pound, and 1d. for a quarter of a pound of sugar, besides weighing paper with the parcels. These trifling losses make a considerable difference in a person's expenditure in the course of the year.

Another important point is purchasing provisions as much as possible first-hand. Every person who trades in an article must have a profit on it. Thus, if I go to a small grocer who buys his tea and sugar of another retail grocer, it is evident that I must pay more in price, quantity, or quality, than I should

have paid at the better shop ; and in all probability the quality will be inferior, which is the worst way of paying the difference. If, therefore, there are markets for meat, vegetables, fruit, butter, eggs, and poultry, the mistress of a house will find a great advantage in going to them ; she has much more choice, she is not obliged to purchase if she does not find just what she requires, and in most cases the sellers offer their home produce ; the gardener sells the vegetables he has cultivated, and the farmer's wife the butter, eggs, and poultry raised on the farm. The consumer has thus to pay only one profit instead of two or three.

One of the very worst plans anyone can adopt is obtaining goods on credit. It is generally only inferior shops, frequented by the poorest and least thrifty class, which allow their customers to run up accounts. The evils of the system are many. The shopkeeper must charge a higher price as interest for his money, and to pay for the trouble and expense of booking, even if all his customers pay in the long run ; but some do not, and his profits must be made to cover his risk of losses. One of the worst features of the plan is that it tempts people to get a great many things which they ought to do without. It is so easy to order things when you have not to pay for them immediately, and settling-time seems a distant evil ; so long accounts are run up, and people fall into difficulties from which they can hardly ever extricate themselves. And when a man cannot pay off a long-standing debt, but only an occasional instalment, he becomes the mere slave of the shopkeeper, who makes him take inferior articles at the highest prices, while he dares not go elsewhere to buy. There is no slavery more bitter to an honest mind than debt. Even if people make a point of settling regularly once a week or once a month, it

14 USEFUL KNOWLEDGE READING BOOKS.

is not wise to forestall one's income ; for if sickness, loss of work, or any other misfortune should occur, it is far better to have the week's, month's, or quarter's wages in hand, than to have to use it all to pay the past week's, month's, or quarter's bills. It is very well, and often most convenient, for wealthy persons to have regular settling times with their tradesmen, but for people with a small limited income depending on labour, and requiring considerable management to 'make all ends meet,' the rule of getting nothing that cannot be paid for at the time should be strictly adhered to.

People should not get things which they do not need. Buying bargains is nearly always a waste of money. Some people are fond of going to sales and picking up all manner of odds and ends, pieces of cloth which will not make a coat or pair of trousers, gloves too large or too small, pots and kettles of which they have already sufficient, just because they are cheap. The money thus wasted must be subtracted either from really necessary expenses, or from what ought to have been saved.

In respect to the prices which ought to be given for things, there are two opposite evils. Some persons can fancy nothing for which they do not pay a high price ; others, again, have a rage for cheapness. While the one class of persons will reject a shawl at 25s., and buy an exactly similar one for 30s. because they think it must be better, the other kind will buy decayed vegetables, unwholesome or tainted meat, clothes which will not wear, and furniture which will fall to pieces in twelve months, just because they are low-priced. This is great folly, for bad things are dear at any price. Every woman should make herself acquainted with the qualities of things ; she should be able to judge what is good in meat, fish, vegetables, groceries, and clothing, and

while a sensible woman will see that it would be folly to give a fancy price for expensive luxuries, she will as carefully avoid the other folly of buying any article which is not thoroughly good and serviceable.

E. T.

NEVER MIND THE REST !

<i>mis'-sion, that for which any one is sent stew'-ard, one who takes care of property for another</i>	<i>ful'-fil', to do, to perform grav'-en, engraved, written count'-less, too many to be counted aye, always, ever</i>
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TRUSTFULLY and hopefully
 O ! tread the path of life :
 It may not be all flowers,
 Neither free from care and strife ;
 But it is by blows that iron grows
 Of greater strength possessed ;
 Then bear life's buffets manfully,
 And never mind the rest.

Each thing hath its work to do,
 Its mission to fulfil,
 The wind that blows, the plant that grows,
 The waters never still.
 Then need we ask ' Have we a task ? '
 'Tis graven in each breast ;
 ' Go, do life's duties faithfully,
 And never mind the rest.'

Fear not pain or poverty,
 Fear no earthly thing.
 The poorest man, who does his part,
 Is equal to a king ;

For a king hath cares, a king hath fears,
 Proud heart, but anxious breast,
 With, just like you, his work to do,
 Aye striving like the rest.

Gentle words and kindly deeds
 Are never thrown away,
 But bring unlooked-for harvest
 On some cloudy autumn day.
 We are but stewards of our wealth,
 Of all by us possessed ;
 Then do life's duties manfully,
 And never mind the rest.

O ! look up to the heavens by night ;
 Then doubt it if you can,
 The countless eyes of Providence
 Look lovingly on man.
 'Tis little good we here can do,
 But let us do our best,
 With thankful hearts and willingly,
 And never mind the rest.

HY. FASE.

LADY RUSSELL.

ad-vers'-i-ty, *misfortune*
 ven'-om-ous, *poisonous*
 de-fect'-ive, *imperfect*
 per-pet'-u-al, *lasting*
 keen'-ly, *sharply, severely*

for'-ti-tude, *bravery in enduring*
 suffering
 in-di-ca'-tion, *a sign or mark*
 ag'-on-y, *severe pain*

' Sweet are the uses of adversity,
 Which, like the toad, ugly and venomous,
 Wears yet a precious jewel in its head.'

THERE are but few women whose conduct has called forth more sincere sympathy and warm admiration than that of Lady Russell.

She was the daughter of the Earl of Southampton; and was born in 1636. From her very infancy it would seem that trouble was to be her lot in life. Her mother died while she was yet too young to know a mother's care and love. This loss may, in a measure, account for the defective character of her education. Though naturally clever, her letters are full of such errors as we should not expect to find in them. She was, however, almost as remarkable for her good sense and sound judgment as for the many virtues which made her a truly noble woman.

The times in which she lived were full of political troubles. Charles II. occupied the throne; and though the nation at first rejoiced in the 'Restoration,' there were many who soon saw in the King's conduct reason to regret their choice. Many plots were set on foot; and connected with one of these we find the name of Lord William Russell, the husband of Lady Russell. He was accused of high treason; and, though innocent of this offence, he had been engaged in a conspiracy. In this, as in all his actions, Lord Russell was influenced by a strict sense of duty—to himself and to his country.

The first result of this act was imprisonment in the Tower; and through this, the life of Lady Russell assumed, in a measure, a public character. Hitherto her life had been devoted to her home;—to the education of her children; and to rendering those around her happy.

Now, however, a great change took place. The gloomy walls of the Tower formed a living tomb for her husband, to whom she was much devoted. He felt that from the moment of his imprisonment his doom was fixed. Hope seemed to have left him when liberty was lost. Bravely did Lady Russell bear the trial. No one could have felt it more

keenly; and yet, in the presence of her husband, there was no indication of the anguish of her heart. She felt that to give way to her feelings would be to render his lot harder to bear; and, like a true woman, she endured in silence.

Lady Russell did not rest here. Nothing that she could do to obtain his pardon was left undone. On her knees she besought the King to spare his life; but the daughter of one of England's peers begged in vain. She was willing to go with him into perpetual exile;—to do anything, in fact, except urge him to forsake his principles, and thus save his life.

When the trial of her husband took place, the fortitude and constancy of Lady Russell were put to a further test. She not only attended his trial throughout, but wrote, in the open court, the notes which had reference to his defence. Thus she tried, by this last effort, to strengthen and support her husband in his hour of need; and, if possible, to avert his doom.

With terrible force came the awful sentence of execution in front of his own windows. The latter part of this sentence was afterwards altered, so that instead of Bloomsbury Square, Lincoln's Inn Fields became the scene of his execution.

We can imagine the effect of such a sentence on the tender and loving heart of Lady Russell. And yet her actions gave no sign of the heart-rending agony which, from her letters, we know she suffered. With calmness and fortitude she still visited the Tower, administering that comfort which religion alone can give.

When the hour of final separation drew near, she brought her children to receive their father's last blessing and farewell. Lovingly, but firmly, she led them away; and then came the hardest trial of all. Through that bitter moment of parting Lady Russell

passed without one tear which should unnerve her husband, and unfit him for the awful struggle which awaited him.

Lord William Russell was executed the next day, July 21st, 1683; and of the anguish of his widow we can form but little idea. She speaks of the rest of her life as 'bewintered' by the blow; and yet that life was a useful one—useful to her children, and to all with whom she came in contact. Her history should awaken, in every girl who reads it, a desire to grow up such a woman as she was;—one in whom we find gentleness blended with fortitude, and love tempered with judgment.

Look on her as a model to which you may attain; and be sure that the time will come when you will stand in need of the very virtues in which Lady Russell excelled.

H.

GOSSIPING.

fa'-tal, *deadly*
 in-dis-crim'-in-ate, *done without*
 thought or judgment
 ex-ag'-ger-ate, *to speak of a*
 thing as greater or less than
 it really is
 o-ri'-gin-al, *as it was at first*
 com'-pe-tent, *able, fit*
 re-serve' (n.), *a keeping anything*
 back

ten'-den-cy, *inclination*
 ad-dict'-ed, *prone*
 bi-og'-ra-phy, *a written life of a*
 person
 pat'-ri-ot, *a lover of his country*
 do-mes'-tic, *relating to the house*
 or family
 pro-pens'-i-ty, *a strong habit*
 man'-tle, *a cloak*

THERE is scarcely anything more fatal to our own happiness and that of our fellow human beings than the habit of thoughtless and indiscriminate chattering. When people come together to enjoy themselves it surely cannot be necessary to talk in a loose and careless manner, with but little regard to the

truth of what is uttered. It is a very easy thing to take away anybody's character by thus indulging in vain talk; and the mischief thus done in a very short time may take a whole lifetime to repair. Besides, anything we may say against a neighbour is sure to be exaggerated and added to, and we are often surprised to find the original words become altogether changed. In nine cases out of ten we are not competent judges of our neighbours' words and actions, because we do not know and are not meant to know the motives which have prompted them to speak and act. And yet, notwithstanding this, we continually hear men and women and boys and girls speaking about other people as if they were well acquainted with the heart and soul of those amongst whom it is their lot to live. Gossipers, that is people who indulge in vain and idle talk, are often very kind-hearted people; they do not wish to do any harm, and are often very sorry when they hear that, through their thoughtlessness, mischief has been wrought. But this does not mend the matter to those who have to suffer. We are bound to consider, all of us, both young and old, what we are going to say and what we are going to do. We are meant to talk to each other and make each other happy by pleasant and cheerful conversation. Any one can see that much when we look round upon the world, and understand how each life is bound up in and dependent upon another—a brother's, father's, mother's, sister's, friend's, or all of them—we must believe that one part of our duty is to talk cheerily and kindly, and to try and prevent all quarreling and disagreement among families and neighbours. And if we endeavour always to keep this in mind we shall often stop short before ill-judged words come out of our mouth. The fact that another in our hearing says a hard and unkind

thing about some one we know, or do not know, as the case may be, is no reason why we should go about repeating it, and joining in every idle group of gossipers to add our portion to the empty chatter. See how careful all good and sensible people are not to say anything of importance before those who have the character of repeating all they hear, without regard to the mischief they may do.

How strangely the meaning of the word gossip has been changed ! A very long time ago it did not call to mind anybody disagreeable or unkind. Gossips, or gossibs, were those who were related to one another in God ; akin in some good and kind office which they fulfilled under God. But, step by step, the word lost its good and pleasant meaning. And this is how it came to pass. It is generally the case that those who are related or akin in any way see more of each other and converse together very freely and without reserve ; and as there is a tendency, in all who talk much, sometimes to talk idly and vainly, so the word gossip came by degrees to be applied to all those, whether related or not, who were addicted to thoughtless tittle-tattle.

It is strange that so many people, both old and young, should choose unpleasant and unprofitable subjects to talk about, when we have only to look around us to find much that is pleasant and instructive. When we are in the country, the green fields and flowers, and the grand old trees ; the birds, and the fish that swim merrily down the stream or bask on the surface of the water, enjoying the warm sun ; the plough turning up the earth and making it fit for the reception of seed, which springs up into wheat, or barley, or oats. These, and a thousand other things, would give us plenty to talk about in a cheerful, happy way, without doing any of that harm which belongs to idle gossiping.

And if we are in a town and cannot get out into the bright open country, still we cannot fail, if we choose to look for it, to find much that is interesting and instructive to talk about. There are the railways, and we hear the whistle of the engine as we pass the station; there are many beautiful manufactures to be seen in the shop windows; many museums containing curious and valuable works of art; many handsome buildings; all of which, when we see them or read about them, may cause our thoughts to flow and our tongues to speak pleasantly. And wherever we may be, in a large and thickly peopled town, or in the open country, we can always talk to one another about some interesting book we have read, some thrilling account of a brave adventure, some tale of domestic life, the biography of some hero or patriot, or a fact to be remembered in the history of our country.

How much better would it be thus to employ our leisure hours when we are in the company of our neighbours, or friends, or brothers, or sisters, and have time for conversation, than in the indulgence of a very wrong propensity to speak idly, and vainly, and unkindly about those who are not present! Of course we are obliged to talk of others sometimes, but when we do so, we must always take good care to say the best and kindest thing we can; to dwell upon their good points, and gently to cover their faults with the mantle of charity.

W. E. C.

SEASONABLE FOOD.

MEAT, FISH, VEGETABLES, AND FRUIT.

stip'-u-late, <i>to fix the terms of a bargain</i>	con-sti-tu'-tion, <i>form, make</i>
damp'-er, <i>a kind of bread</i>	e-co-nom'-ic-al, <i>saving, not waste-ful</i>
mon-o'-ton-ous, <i>always the same</i>	en-sure', <i>to make sure of</i>
phys'-ic-al, <i>natural</i>	in-def'-in-ite, <i>not fixed</i>
in-stinct'-ive, <i>belonging to instinct or natural feeling</i>	in-sip'-id, <i>tasteless</i>
	pro-cur'-a-ble, <i>able to be got</i>

WE generally look upon salmon as a dainty, and can hardly imagine that we could ever become thoroughly tired of it. Nevertheless, we know that formerly, when this delicious fish abounded in the rivers of Scotland and the north of England, farm-servants, when hiring themselves, used to stipulate that they should not be compelled to dine on salmon more than twice a week.

A man in Australia, writing to his brother in England, said, 'We have abundance of meat and flour, and tea costs us only one shilling a pound, but we are heartily tired of this style of living, mutton, damper, and tea; tea, damper, and mutton for breakfast, dinner, and supper.'

These are two instances of plenty of good, wholesome food, and even of what we consider as luxuries, failing to please or satisfy, because of the monotonous repetition of the same dishes. We all long for variety, and this longing indicates a necessity of our physical constitution. Why it should not be wholesome to eat day after day exactly the same kind and quantity of food, it would be hard to say, but just as we know that we do turn with disgust from the same constantly repeated dish, so observation teaches us that this is not an unreasonable whim, but that want of variety in food is really injurious to the health.

It is most interesting to observe how every real want of human nature is provided for by our All-wise and Beneficent Creator. Whenever we discover an instinctive longing, we always find that some provision has been made for supplying it. So this craving for variety in food is met by the constant succession of fruits and vegetables, fish, flesh, and fowl, which are found in greater perfection and abundance at some seasons of the year than at others.

For all these reasons the careful mistress of a family will endeavour to provide as much variety of plain, wholesome food as she can properly afford. And this variety will not be found more expensive than a uniform repetition of the same dishes; on the contrary the most economical plan is to buy such things as are most abundant, and in the greatest perfection at each of the different seasons. It must, however, be admitted, that to ensure considerable variation of dishes without great expense requires intelligence, observation, forethought, and considerable skill in cookery.

We may divide the chief articles of food under four heads. First, bread and other preparations from grain and starch-foods. Second, meat, in its three divisions of fish, flesh, and fowl. Third, vegetables. And fourth, fruits.

The first class, containing bread, cakes, rice and sago puddings, pastry, &c., is not to any appreciable extent subject to variations from the seasons; for corn and starch may be stored up for an indefinite period. These two articles, being insipid, do not pall upon the taste; and this is the case with most things which have no decided taste, such as bread and potatoes, so that they do not become disagreeable by repetition. Though a good cook may produce a great variety of dishes made from flour, rice, arrowroot, tapioca, &c., still the true value of these

articles rests rather in their plainness, which never wearies us, than in the power of varying our diet.

By the term meat we generally mean beef, mutton, veal, lamb, and pork. The two former are always to be had, though they are considered better in the latter part of the year, and in winter, than during the spring and summer. Lamb and veal come into season in the early spring, but are very dear from Easter to Whitsuntide. Fresh pork is only good in cold weather, from about October to March. Bacon and ham are always seasonable, but are most convenient in summer, when fresh meat will not keep well.

Rabbits and hares are in season during the winter, from October to the end of February; leverets and young rabbits from about June. Pigeons are fit for pies in early spring, and the young rooks are ready by the middle of May. Chickens and young ducks are sufficiently grown about June, and geese are in season from Michaelmas until after Christmas. Turkeys are a well-known Christmas dainty. Partridges come into season on the 1st of September, and pheasants in October.

The seasons when the principal kinds of fish can be procured vary considerably in different years, and differ also according to the nature of the coast, from causes of which we know little. It is not possible to do more than give a very general account of the times when each kind can be had. The commonest kinds of salt-water fish are cod, ling, and soles, which may be procured all the year round, but are in their greatest perfection from October to January; mackerel abounds from April to the end of the summer; and haddock, herrings, and sprats, which are in season in the autumn and winter, are very cheap and plentiful in October and November. Oysters come into season in August, and are in till the end of April. Crabs, lobsters, shrimps, and prawns are best

in the summer. Salmon is procurable throughout the summer, but is always expensive. Most of the fresh-water fish are in season in summer time. Trout, perch, dace, roach, grayling, salmon-trout, &c., range from about March to October. Eels and pike are caught throughout the year.

We have a very great variety of vegetables according to the season; necessarily most kinds which require to be eaten fresh are only to be obtained in moderately warm weather, though there are a few exceptions, as in the case of those which are natives of colder climes. In winter we are confined, to a great extent, to those vegetables (chiefly roots) which can be stored up. Potatoes are good nearly or quite all the year round, the many varieties enabling us to have them fresh dug from the beginning of June till October; and the latter sorts, if carefully kept, lasting till the new ones come in. Carrots, turnips, beets, parsnips, and onions, too, can be kept for winter use. In the winter our gardens yield us certain green vegetables which are not injured by the frost, as brocoli, savoys, and celery. In May and June our regular succession of garden crops commences, beginning with cress, radishes, and spring onions; then turnip-greens, spinach, and early cabbages; about the end of June green peas and early potatoes, though they are then rather dear; in July and August we have French and kidney beans, besides cauliflowers, turnips, asparagus, and all kinds of salad. In October onions and shalots are in perfection.

Fruit depends upon the seasons quite as much as vegetables. For puddings and pies the earliest product of this kind is rhubarb, which is certainly not a fruit but the stalk of a plant, but as we use it in the same manner as fruit, the taste of which it resembles, people sometimes class it among fruits. It may be

procured abundantly from March to the end of the summer, and is both cheap and wholesome. About the end of May green gooseberries may be used. At Midsummer cherries, currants, raspberries, and strawberries are ripe; gooseberries ripen a little later. In July the earliest apples, pears, apricots, and plums are ready, and the various kinds continue to come to perfection down to the end of October, when the latest sorts are gathered. Apples and some kinds of pears are stored for winter. We have few wild fruits worth eating, but delicious blackberries are found in most parts of England about August and September, and nuts are gathered in the hedges in the latter part of autumn. On the heaths and moorlands cranberries and bilberries are found at the same season.

In winter we are generally well supplied with oranges, which we procure chiefly from Spain and Portugal. Other foreign fruits, as nuts of various kinds, dates, figs, and raisins, can be got nearly always, but are best in winter.

E. T.

WHO WILL CARE FOR MOTHER NOW ?

*com'-rade, a companion, a fellow- | an'-guish, severe pain of mind or
soldier | body*

WHY am I so weak and weary ?
 See how faint my heated breath,
 All around to me seems darkness,
 Tell me, comrades, is this death ?
 Ah ! how well I know your answer !
 To my fate I meekly bow,
 If you'll only tell me truly
 Who will care for mother now ?

Who will comfort her in sorrow ?
 Who will dry the falling tear ?
 Gently smoothe her wrinkled forehead ?
 Who will whisper words of cheer ?
 Even now I think I see her,
 Kneeling, praying for me now,
 Can I leave her in her anguish ?
 Who will care for mother now ?

Let this knapsack be my pillow,
 And my mantle be the sky ;
 Hasten, comrades, to the battle, -
 I will like a soldier die.
 Soon with angels I'll be marching,
 With bright laurels on my brow ;
 I have for my country fallen,
 Who will care for mother now ?

FLORENCE NIGHTINGALE.

pa'-tient, a sufferer, a sick person	en-dure', to suffer
vol'-un-tar-y, of one's own free	re-sume', to take up again
will, without pay	em-bark', to go on board ship

' Yet earth has angels, though their forms are moulded
 But of such clay as fashions all below ;
 Though harps are wanting, and bright pinions folded,
 We know them by the love-light on their brow.
 I have seen angels by the sick one's pillow,—
 Theirs was the soft tone and the soundless tread ;
 Where smitten hearts were drooping like the willow—
 They stood between the living and the dead.'

FOREMOST amongst those women who have proved themselves 'ministering angels' comes Florence Nightingale.

Though her name must be known to almost every girl, yet perhaps but few have thought of her as a noble example which they should endeavour to follow. From her earliest years she might well be viewed in that light—in her home as well as in the world.

Florence Nightingale was born in Italy, in the city of Florence, from whence, it seems, she derived her name. Though England cannot claim the honour of her birth, yet in all other respects she is an Englishwoman. Her early years were passed at Lea Hurst, in Derbyshire. There—for the most part in her own home—she received her education. A part of this education consisted in the study of modern languages, which proved most useful in her after life.

Even in the childhood of Florence Nightingale there appeared much of that sympathy with suffering for which she is so remarkable. In her attempts to aid those around her, she was encouraged by a benevolent father, and soon her interest extended to all the hospitals and schools in the neighbourhood of Lea Hurst. At her own earnest wish she was brought to London, where she visited most of the workhouses and hospitals. The Middlesex Hospital, in particular, seems to have occupied much of her attention. After this she visited many of the hospitals throughout the country, endeavouring to learn in each place the best modes of nursing the sick and soothing the sufferer.

In this way Florence Nightingale gained much experience in the treatment of patients, but with that experience came the conviction that the art of nursing received but too little attention in England. In Germany an attempt had been made by a good man, Pastor Fliedner, to establish a school for the training of nurses, and to this institution Florence

Nightingale went as a voluntary nurse. Far from her home and friends, surrounded by sickness and death, she spent six months in this hospital, learning the art of nursing. Before returning to England she visited other continental hospitals, in many of which she found ladies, who, like herself, had made the care of the suffering their grand object in life.

The knowledge and experience thus gained soon proved a blessing to many, for the Crimean War commenced. From our armies there came daily accounts of the sufferings endured by the wounded, who lay in agony without the gentle hand of a mother or sister to soothe their pain. In the French camp there were Sisters of Charity, who went out to take care of their sick and wounded: and soon the question arose as to who would go from England.

Every girl knows how that question was answered. Florence Nightingale went in 1854 to be a 'ministering angel' in the hospital at Scutari. Forty-two nurses were placed under her superintendence, some of them ladies of rank. In a few days after their arrival the battle of Inkermann gave to the hospital 600 patients. In addition to the ravages made by the sword, cholera and fever laid many a strong man low. Standing truly 'between the living and the dead,' soothing every form of suffering, Florence Nightingale continued to labour till her noble career was checked for a time by fever. As soon as she had recovered, her charge was resumed; and it was not till the last of the army had embarked for England that she, too, returned to her home.

It is almost needless to state that she was received with the heartfelt gratitude of a nation; for, from the Queen on her throne to the poorest of her subjects, all united in offering her the thanks which she so well deserved.

Though peace has now taken the place of war,

Florence Nightingale still continues her labour of love; and there is not a girl in all this land who would not sincerely echo the wish, 'Long may she live to do it.'

Try to follow her, though it may be at a great distance. Be ready and willing to help the suffering and to cheer the sorrowful; and, in doing this, you will become more like Him who came 'to bind up the broken-hearted.'

H.

MAKING STOCKINGS.

e-las'-tic, *springy, stretching easily*
 ba'-sis, *base, foundation*
 or'-al, *given by word of mouth*
 un'-bleach-ed, *not whitened*
 ap-pro'-pri-ate, *fit, suitable*
 pat'-ron-is-ed, *assisted, kindly treated*

op'-er-a-tives, *working people*
 ho'-sier-y, *knitted goods, such as stockings, gloves, &c.*
 de-duc'-tion, *something taken away*
 ex'-quis-ite, *very beautiful, delicate, fine*

THERE is no woven fabric which unites strength and elasticity so perfectly as that of which our stockings are made. It will be easily seen how necessary both these qualities are; for if stockings were made of any comparatively inelastic material, they must either be made loose or they would be liable to burst out, as tight sleeves often do; and loose stockings would both look clumsy and be very uncomfortable to wear. But until the 16th century stockings, even for ladies, were made of cloth, for we find that in A.D. 1561, the magnificent Queen Elizabeth, who loved everything that was splendid in dress, became the happy possessor of a pair of knitted stockings, and that they pleased her so well, that she resolved from that time to wear no more cloth-stockings. Thenceforward the art of stocking knitting (by whom in-

vented we know not, but probably brought to us from Spain or Italy) became a common employment among the women of England, and the sister countries, and in spite of the enormous quantity of woven stockings which are now made, continues to be practised by the peasant women of the north of England, Ireland, and Scotland, as well as to a less degree by ladies in all parts of the country. The warmth and strength of knitted stockings recommend them for winter wear, while the operation requiring less attention and less eye-sight than sewing, is very suitable for elderly ladies or partial invalids.

All who read this lesson, whether they can knit a pair of stockings or not, probably know in what the operation of knitting consists,—that a row of loops made upon a needle forms the basis of similar rows formed by looping a continuous thread by means of a second needle through each of the previous loops or stitches successively. Thus the whole piece is a continuous chain-work, every row being the basis of the succeeding row, and a single thread forming the whole fabric. To be able to knit a stocking requires a knowledge of something more than this; but, like needle-work, oral instruction and practice are requisite for teaching it. A few hints may however be useful.

Queen Elizabeth's stockings were made of silk, but silk is now scarcely ever employed in knitting stockings; silk stockings being articles of luxury in use only among the higher classes, are made very fine, and much finer work can be produced by the stocking-frame than by hand-knitting. The materials used are chiefly worsted, Scotch-wool, Angola, and cotton both white and unbleached. The number of stitches to be cast on will vary according to the size of the stocking, the fineness of the worsted or thread, and of the needles. For a man's stocking from 120

to 140 is about the proper number, and for a woman's from 96 to 108. Ribbed stockings are rather more difficult to make than those which are knitted plain, but they fit better, and are generally thought to have a better appearance. The narrowing of the calf of the leg and the forming of the heel require great care. The inexperienced knitter should diligently follow her pattern or obtain exact directions on all these points from some one who thoroughly understands them.

Knitting is necessarily rather tedious work, as every loop of the stocking requires to be made separately, and the making of each loop requires three distinct movements, but it is surprising how quickly thoroughly accomplished knitters get on with their work. It used to be considered that a first-rate knitter could knit a pair of stockings in a day, but there are few, if any, such knitters left now. In the country districts of Wales and Ireland the women frequently knit as they walk along the road, and the people of the Shetland Isles are famous for their skill in knitting, not only stockings, but many fancy articles, as shawls, veils, comforters, &c.

But by far the greatest part of our knitted goods is produced by the machine called the stocking-frame. We talk of *stocking-weaving*, but the term is scarcely appropriate, as the process is an exact imitation of knitting, and is more properly called 'frame-work knitting.'

It is said that the stocking-frame was invented in the reign of Queen Elizabeth, by a gentleman named William Lee, who conceived the idea of a machine for knitting by constantly watching the motion of his wife's hands as she diligently plied her needles. Obtaining little encouragement in England, Lee went to France, where he was kindly patronised by Henry IV., but after the assassination of that

monarch he suffered the usual fate of inventors, and died in Paris in great poverty. Lee's workmen returned to England, and the stocking manufacture was soon established as a branch of our national industry. In the stocking-frame, as in hand-knitting, the whole piece is made of one thread, forming a succession of loops; the chief difference between the two processes is that, whereas in hand-knitting each loop is made separately, in the frame the loops are formed along the whole length of the fabric by a single motion of the machine. Again, while the hand-made stocking is knitted round, and the shape formed as the material is produced, in the frame the piece is woven open, and afterwards seamed up. There are, however, several varieties of the stocking-frame, which produce stockings of different kinds.

Many other articles besides stockings are produced in the frame, as gloves, drawers, under-shirts, waistcoat-pieces, jackets, and night-caps. The materials used are silk, worsted, and cotton.

The counties of Derbyshire, Nottinghamshire, and Leicester are the chief seats of the hosiery manufacture in England. The silk hosiery is almost confined to the neighbourhood of Derby, worsted is the principal part of the Leicestershire trade, and cotton hosiery is mostly produced in Nottinghamshire. But little steam-power has been hitherto applied to frame-work knitting, most of the work being performed in the cottages of the operatives. The usual plan is for the masters (hosiers, as they are called) to give out to the persons they employ a certain quantity of thread, which they return at the end of the week in the form of hosiery. The masters are usually the owners of the frames, which they let out to the workmen (or stockingers) at a certain weekly rental, usually one shilling or one and threepence per week. Besides weaving up the thread the workman must

provide himself a *winder* (usually a boy or girl), whose duty it is to wind the thread round a certain part of the machine, and a seamer, a woman, who sews up the backs and feet of the stockings after the weaving has been done. When these deductions have been made from a man's earnings, the rate of wages is lower than that of most other branches of manufacture. Both in Leicester and Nottingham there are, however, large factories in which all the work is done, and in which steam-power is extensively used. England not only supplies herself with hosiery, but exports it largely. Both Ireland and Scotland produce considerable quantities.

Stockings of silk and linen thread are often made of exquisite fineness; a dozen pairs have been made which weighed only 9 ounces. Knit stockings cannot compete with woven ones in beauty or delicacy; it is only on the ground of durability that they can have any claim to rival them. As a matter of economy too, in cases when more profitable use cannot be made of the time, it is well worth while to knit at least winter stockings for a family. The cost of the worsted for a pair of man's stockings will be about 1s. 6d., and of a woman's 1s. 2d., and it is quite certain that good stockings cannot be got for that price, though inferior ones can be got very much cheaper.

E. T.

THE SKIPPER AND HIS BOY.

skip'-per, the captain of a trading vessel	mag'-net-ize, to rub with a load-stone or magnet
'neath, beneath	as-sail', to attack
gal'-lant, brave	quoth, saith
com'-pass, an instrument containing a magnetised needle which always points to the north, and by which ships are steered	brief, short
	jas'-per, a precious stone of various colours

THE sea ran high and the wind was wild,
 When the skipper called to his only child :
 ' My boy, if fears assail thee now,
 Go pray in silence down below.'
 ' Fear !' cried the boy ; ' I know not fear,
 Father, when thy right arm is near ;
 For merry it is o'er the waves so high
 To ride together, my father and I.

' Mother will watch from the door and pray
 For us both, dear father, till break of day ;
 And she 'll be the first, when her prayer is done,
 To catch sight of our sail 'neath the morning sun.'
 ' Yes, yes,' quoth the skipper, brief and stern,
 ' To-morrow shall see our bark return ;
 O'er the green waves, 'neath the morning sky,
 We 'll sail together, my boy and I.'

She is watching, watching—but never more
 Will that gallant skipper return to shore ;
 The boy's black handkerchief lies on the sand,
 It was tied round his neck with her parting hand ;
 And all of the skipper that doth remain
 Is the compass he never shall use again ;
 But she knows that on the Jasper sea
 They ride together, his boy and he.

PRASCOVIE LOPOULOFF,

THE HEROINE OF SIBERIA.

a-chieve', to do something im-
 portant
 fil'i-al, relating to a son or
 daughter
 a-vail, use
 in-hos'-pit-a-ble, unfriendly
 ex'-ile, one who is driven from
 his country
 de-spair', hopelessness
 sol'-i-tude, loneliness
 un-daunt'-ed, not frightened

ac-cede', to consent
 fi'-nal-ly, at last
 in'-val-id (n.), a sick person
 ex-cite', to stir up
 re-cit'-al, an account, a narrative
 in-ter-cede', to speak to one per-
 son in behalf of another
 e'-dict, a law or command
 vol'-un-tar-i-ly, of one's own free-
 will

' Let us, then, be up and doing,
 With a heart for any fate;
 Still achieving, still pursuing—
 Learn to labour and to wait.'

So strange is the history of Prascovie Lopouloff, that we may fall into the error of thinking that history a work of fiction. It is not so, however, although a very popular story (Madame Cottin's 'Exiles of Siberia') is founded on it.

Knowing, then, that it is a reality, not a mere imagination, the story of her untiring perseverance and filial love should carry with it that weight which belongs to reality alone.

The father of Prascovie belonged to a noble Russian family; and he himself had won a name for bravery in the attacks which Russia made on Turkey at the close of the last century. Some time afterwards he was suspected of an offence against the government, and without the opportunity of proving his innocence was condemned. His sentence was exile for life in Siberia, and all his appeals against its severity and injustice proved of no avail.

To this most inhospitable of all climates, with an

exile's allowance, which was scarcely sufficient to keep off starvation, Lopouloff was banished with his wife and infant daughter. Thus it was that the first ideas of Prascovie were connected with a home of poverty, situated in the midst of a dreary plain, snow-covered from September till May. During the short summer a little work was to be had in the fields, and to this the girl went cheerfully—happy to be able to obtain a few comforts for the household. Having known no other mode of life, Prascovie was quite content with this. Though she did not know the cause of her father's settled gloom, and her mother's constant anxiety, yet she did all she could to comfort them both.

It was not till she was fifteen that she learned, by accident, that her father was an exile. Coming from her work unexpectedly, and seeing her father in a state of despair at the failure of a petition to the Emperor, she at once resolved to travel to St. Petersburg, and crave in person her father's release.

Very wild that idea would have seemed to her parents had she told them of it; but to none save her Father in Heaven, did she trust her secret. In the solitude of a wood near her home she prayed to Him for strength to make her purpose known to her parents, and afterwards to carry it out. She knew the difficulties in the way. In the first place, hundreds of miles separated her from St. Petersburg and the Emperor. Her parents were too poor to help her to undertake such a journey; and even were they rich, what means were there of travelling over the wilds of Siberia? On foot and alone must the journey be accomplished.

Undaunted by the thought of all these difficulties, she laid her plans before her parents, and begged them to accede to them. If anything could have caused Prascovie to turn aside from her purpose, it

would have been the way in which her parents received her proposal. At first they treated it with ridicule; but finding her resolution still unshaken, her father reasoned with her on the subject; and, finally, forbade her to mention it again. For three years no further attempts were made by the girl to obtain the desired permission. During that time her mother had a dangerous illness, from which she recovered very slowly. While gently tending the invalid, Prascovie 'learned to labour and to wait.'

At last, after health and spirits had begun to fail under the disappointment, her parents consented to her going. They did so, however, with the utmost sorrow, feeling they should never see her again. With all these discouragements she set forth; and on such a journey as no other woman has ever undertaken.

Through frequent storms and intense cold, she still went on, till her bare and bleeding feet could carry her weary body no longer. In this state she was found by a peasant, who in pity took her home. After a time she was able to resume her journey; but soon the winter set in, compelling her to give up, and be thankful for the shelter which pitying strangers offered her.

Hope had almost forsaken her when, by a strange series of events, she found a friend in a benevolent lady in Ekaterinburg. This lady, Madame Millin, was so interested in her story, that she not only secured for her a place in a boat to Nijui, but also gave her a letter of introduction to a person of influence in the Court.

In this part of her journey a storm on the river nearly proved fatal to the poor girl and all her hopes. A violent fever was the result of the drenching she received by the upsetting of the boat. On arriving at Nijui, she was taken to the convent, where, by the

kindness and care of the nuns, she was quite restored to health. On leaving, the abbess supplied her with money to complete her journey in a covered sledge. In this way, eighteen months after starting, she reached St. Petersburg, where fresh difficulties awaited her.

Day after day she waited outside the Senate House, hoping to find some one who would present her petition to the Emperor. Some looked coldly on her; some treated her with scorn; while one, more benevolent than the rest, gave her money. At last she found an opportunity of presenting the letter which Madame Millin had given her. This proved the turning point in her course. The interest which the account of her noble conduct excited was so great, that before long Prascovie found herself in the presence of the Empress-Mother.

Simply, but without fear, she told her story; begging, not mercy for her father (for he was innocent), but that his sentence might be altered. Touched by the recital of her history, the Empress promised to intercede with her son; and thus it was that Prascovie soon had the opportunity of presenting her petition to the Emperor, Paul I.

The result of the interview was the complete restoration of her father's freedom and possessions; and liberty to two other exiles also. This latter boon was granted by the Emperor as a personal favour to Prascovie, on whom he wished to bestow some mark of his sincere admiration for her devotion to her parents. Great was the joy, and as great the surprise, when the Emperor's edict reached Prascovie's home. At her request her parents met her at the convent in Nijui; and there she resolved to spend the rest of her life. This she thought the best way of showing her gratitude to God for the great success with which He had blessed her. It seems a pity

that so noble a woman should thus, voluntarily, cut herself off from doing still more good to the world; but in this, as in every act of her life, she was resolute.

After eight days her parents parted from her for ever. Her life was not a long one; she died December 8th, 1809, leaving behind her a name for true heroism which will never be forgotten.

H.

ROME.

an-ti'-qui-ty, <i>times long ago</i>	lu'-cra-tive, <i>profitable</i>
at-tract', <i>to draw to</i>	sanc'-tion, <i>to approve of, to agree</i>
ex-ec'-u-tive, <i>having the power of</i>	to
carrying out laws	ma-jor'-i-ty, <i>the greater number</i>
con-vene', <i>to assemble</i>	pre-pon'-der-ate, <i>to outweigh</i>
treas'-ur-er, <i>one who takes care</i>	ob'-vi-ate, <i>to prevent mischief</i>
of money for a public body	strat'-a-gem, <i>a trick</i>
sym'-bol-ize, <i>to represent by</i>	pre-con-cert'-ed, <i>arranged before-</i>
means of a symbol or sign	hand

LIKE that of the other nations of antiquity, the early history of Rome defies the research of the student who attempts to separate merely fabulous accounts from history proper. The city of Rome is recorded to have been founded by twin brothers, Romulus and Remus, who in their youth had been exposed on the banks of the river Tiber, and miraculously suckled by a she-wolf. The foundation of the city took place in the year, B.C., 741. The original houses were mere huts, and even the so-called palace of Romulus himself was built of reeds and thatched with straw. The free and daring character of the earlier inhabitants attracted to infant Rome the wild and restless spirits who could ill support the restraints of more civilized life in

the older and more firmly established nations around. In this way early Rome was taken advantage of as a sanctuary for malefactors, outlaws, freebooters, runaway slaves, and other culprits of a fainter or a darker dye, and thus the population of the new city was materially increased.

In the popular choice of a king the election fell upon Romulus, the founder of the city. By the citizens he was accordingly acknowledged as chief of their religion, sovereign magistrate of Rome, and general of the army. Besides a guard to attend his person, he was preceded wherever he went by twelve men armed with axes tied up in a bundle of rods, or *fascies*, the axes to symbolize the executive power of the law, and the rods to signify the strength which lies in unity. The entire power of the king consisted, however, in convening the senate, assembling the people, leading the army, and appointing the *quæstors*, or treasurers of the public money. The senate was composed of one hundred of the principal citizens, who acted as counsellors to the king. In the senate all the principal business of the state was transacted, the king himself presiding, although every question was determined by a majority of voices.

In the course of time two distinct classes were found to have originated in Rome, the Patricians and the Plebeians. The patricians, or nobility, were the descendants of the earlier senators, and held all the more lucrative and important offices both in Church and State. The plebeians were the common people, who could point to no illustrious ancestry. They had the privilege of objecting to or of sanctioning those laws which were passed by the king and state. By their votes all matters relating to peace or war, the election of magistrates, and even the choosing of a king were determined. By

them all enterprises against the enemy were proposed, the senate possessing only a negative voice.

Each plebeian had the right to elect from the patrician order a protector, to assist him with his life and fortune, plead for him before the judge, and attend to his interests generally. On the other hand, the client attached himself to the interests of his patron,—he assisted him, if poor, in raising marriage portions for his daughters, in paying his debts, or his ransom if he was taken prisoner. The client was also bound to serve his patron in war, and to support him with his vote when candidate for any office. He was, moreover, excused from giving evidence in a court of justice if that evidence was likely to conflict with the interests of his patron. From what has been already said as to the origin of the populace of ancient Rome, it will readily be seen that the number of the male population must have greatly preponderated over that of the female. To obviate this difficulty a stratagem was resorted to by Romulus and the senate. A feast was proclaimed in honour of Neptune, and the Sabines, a warlike neighbouring tribe, came, as had been expected, bringing with them their wives and daughters to witness the games which followed the feast. At a preconcerted signal the men of Rome drew their swords, rushed in upon the unsuspecting Sabines, and carried off by force each a wife for himself. The women protested bitterly and with tears against this treatment, but after a time they became attached to their captors, and refused to return to their own kindred, the Sabines. Such was the beginning of that city and nation which future centuries developed into mighty Rome, the mistress of the world.

W. S. R.

POTTERY.

o-paque', <i>that cannot be seen through</i>	ex-pel', <i>to drive out</i>
trans-par-ent, <i>that can be seen through</i>	plas'-tic, <i>easily moulded</i>
sem'-i-trans-par-ent, <i>half-transparent</i>	por'-ous, <i>full of small holes</i>
in'-tim-ate-ly, <i>closely</i>	count-er-act', <i>to do away with a fault</i>
het-er-o-g'e-ne-ous, <i>of various sorts</i>	vit-ri-fi'-a-ble, <i>that can be changed into glass by heat</i>
re'-son-ant, <i>giving a musical sound when struck</i>	ac'-cur-ate-ly, <i>exactly</i>
	dis-tort'-ed, <i>twisted out of shape</i>
	e-lab'-or-ate, <i>done with great skill and care</i>

A VERY large proportion of the useful and ornamental articles which surround us in our homes are known by the general name of pottery. Porcelain is a superior kind of the same manufacture. Pottery is distinguished by being opaque, whilst porcelain is semi-transparent. The name *pottery* is probably derived from or connected with the Latin *potus*, a pot. The manufacture of fine porcelain was originally carried on chiefly in China, and thence it has been called China-ware, by which name it is still frequently distinguished from common earthenware. We cannot ascertain when the Chinese first excelled in this manufacture, but it is certain that fine porcelain was made in that country B.C. 163; and the village of King-te-tching, where the finest and best porcelain is still made, has furnished the Emperors of China with that article since A.D. 442; and the manufactures of that place are still sent all over the world.

The art of making pottery is one of great antiquity. The prophet Jeremiah, who lived more than 600 years before Christ, describes how it was made in his day, and it appears that the potter's wheel was much the same as that now used.

Pottery-ware consists of clay and flint earth, intimately blended together, moulded into the required

form, and then baked. Various kinds of clay, of which there are said to be numerous varieties, are used. Two or more kinds are usually mixed together, according to the judgment of the manufacturer, and other substances, such as carbonate of lime, and silica, or the earth of flints, being reduced to a pulp, are added. The mixture, when moistened with water, is converted into a kind of dough. This dough, when shaped into the desired form, is baked, in order to expel from it the water which made it soft and plastic, and to give hardness and strength to the material. It is, however, still rough and porous, and to counteract this defect it is then covered with a thin coating of vitrifiable substance, and exposed to the heat of the fire, in order to produce a glass-like appearance, and at the same time render the clay impervious to liquids.

The ornamentation of pottery is produced either by moulding it into particular shapes while soft, before it is baked, or by means of painting designs in colours, or printing them upon the article before glazing. The colouring matter is always subjected to the influence of fire, and this process produces a kind of enamel.

The clay very seldom exists in a pure state, but is found combined with numerous heterogeneous matters, from which it must be separated. After this process has been performed, the clay is mixed with sufficient water to make it into a kind of dough, and this is rather a difficult process, one part of the clay being perhaps too plastic, and another not sufficiently so. The whole is then kneaded to one consistency by means of the potter treading it out with his feet, after the dough has been laid upon a flat surface. When by this means the dough becomes of the proper consistency, some form must be given to the articles intended to be fabricated, and

as most of these are more or less rounded, the clay is placed upon an apparatus known as the *potter's-wheel*, or lathe, an instrument of great antiquity. It is a disc of wood, fastened on the top of a vertical spindle, and made to revolve by its being connected with a large wheel, driven by an attendant. A piece of dough is cut and weighed out by the attendant, and handed to the *thrower*, who is seated before the lathe, and forms the clay into the required shape, whilst his assistant turns the wheel, more or less quickly, as required. When, by means of rolling and cutting, the vessel has been brought to shape, handles, spouts, &c., are formed separately, and attached by slips. The article is trimmed with a knife, cleaned with a damp sponge, and is then ready for the kiln. The process above described is known as *throwing*, but there are two other ways by which earthenware is shaped, viz.: *pressing* and *casting*. Plates, dishes, saucers, and such like articles, are sometimes formed by what is called pressing. The clay is laid upon a plaster cast, something in the same way as a crust is put upon a pie; a profile, or shape in earthenware, is pressed upon the paste, and this gives the required form to the bottom of the intended plate. The mould and plate are then conveyed to a warm room, where it takes about two hours to dry. This is called *flat-ware pressing*. There is also hollow-ware pressing, for which purpose the mould consists of many parts, made to fit accurately together. Very delicate kinds of china are made by the process called *casting*.

When earthenware has been formed by one or other of these processes it is in what is called the *green state*, and next requires to be hardened by baking. The potter's *kiln* is usually a large cylindrical brick building, with a dome at the top to let out the smoke. Heat is supplied by means of

several fire-places at the bottom, and the draught is regulated by flues and dampers. Only very coarse articles are exposed to the direct action of the fire: the vessels of clay are packed in cases made of Staffordshire marl—these are called seggars—and the articles require the most careful packing lest their shape should be distorted, or in any way injured; and there are many contrivances for filling up all the vacant spaces. These seggars are packed one upon another, the flat bottom of one being laid on the open top of the one beneath it, the surfaces being separated by a ring of soft clay, and when properly arranged in piles, the door of the kiln is closed with brickwork, the fires lighted, and the baking commences. The fires are increased for about thirty or forty hours, after which time, if the baking has proved successful, no more fuel is added, and the kiln is allowed to cool during the next twenty or thirty hours.

The change produced by the kiln is very great. When the articles are taken out they are hard, brittle, resonant, light-coloured, and porous, and receive the name of *biscuit*. Things which require to be porous, such as wine-coolers, &c., are now finished, but almost all earthenware must be glazed to render it fit for use. If coloured ornaments are required, these are first put upon the biscuit, and the article is then covered with glaze, and re-baked, which is an expensive process. Some manufacturers have, however, discovered a mode of mixing their ingredients, so that this second baking has not been needed; and have, by throwing in a quantity of moist salt when the kiln is very hot, caused a chemical change to occur which has produced a glaze upon the surface of the ware.

The glazing renders the article impervious to the water, and numerous methods have been employed

in the composition of it. When common ware is to be ornamented with a pattern it is put on either before or after the glazing, and is always submitted to the action of heat. It is printed upon the biscuit with an ink composed of resin, tar, various oils and colours, and substances to fix the colour. This ink is made fluid by being spread upon a hot plate. It is rubbed into an engraved plate with a pounce, and the pattern is transferred to a piece of prepared paper. A girl, called the *cutter*, cuts away the unprinted portions of this paper, and a woman, called a *transferrer*, places each portion with its printed side next the biscuit, and rubs it with a piece of flannel till the ink is properly absorbed. The biscuit is afterwards placed in water, and the paper patterns gently washed off with a brush.

In superior pottery the pattern is painted by hand, with a camel-hair pencil, and artists of the highest talent frequently perform this operation. The colours often are much changed by their combination with vitrifiable substances, and none but one experienced in this particular art can judge of the effect the colours will produce. Very much care and labour are expended in this operation, and frequent disappointments occur.

The nations of modern Europe have long vied with each other in producing splendid and elaborate specimens of pottery, and amongst these nations France and England have taken a high rank. It is universally acknowledged that English pottery excels in beauty and convenience of form, solidity, glaze, and cheapness, and it may be seen in use in every country where we may travel.

A large district in Staffordshire, around Burslem, is known by the name of the 'Potteries,' and here the manufacture is pursued to an unparalleled extent, there being an abundance of suitable clay in

the neighbourhood, and plenty of coal for the kilns. Coarse earthenware is likewise made in Northumberland and Yorkshire, and Worcestershire is also celebrated for the finer and more beautiful kinds of porcelain. The *kaolin*, or china clay, as it is usually called, found in the counties of Cornwall, Devon, and Dorset, is of the most superior kind. The first manufactory of fine earthenware in England is said to have been erected in the reign of Elizabeth at Stratford-le-bow, and the Staffordshire potteries came into notice in the same reign, though rude pottery had been manufactured in the country ever since the time of the Romans. About a hundred years ago the genius of Wedgwood gave a new impulse to this interesting manufacture; and from that period it has gone on steadily and rapidly increasing, so that it now takes an important place as one of the sources of British wealth.

Though earthenware is made from very simple materials, and its original processes were rude, yet no art has produced more splendid specimens for ornament, advanced more with the progress of science, nor ministered more to the tastes of persons of mental refinement. Although pottery is amongst the frailest of manufactures, it has proved itself the most lasting of monuments. Whilst temples, columns, tombs, and statues, and even the cities which contained them, have been destroyed, or crumbled to decay, many a rude vase dug from the ruins of such cities, though in itself capable of destruction by a single blow, has told the history of bygone ages, and, like the fossil of some extinct plant or animal, has been a fruitful source of instruction, and served as a link to connect people of very distant ages.

M. A. F.

THE WIFE'S APPEAL.

ap-peal', an earnest request
fu'-ture, the time to come
tot'-ter, to walk feebly

con-sume', to eat up, to waste
bow (v.), to bend

O don't go in to-night, John !
 Now, husband, don't go in !
 To spend our only shilling, John,
 Would be a cruel sin.
 There's not a loaf at home, John ;
 There's not a coal, you know ;
 Though with hunger I am faint, John,
 And cold comes down the snow.
 Then don't go in to-night !

Ah, John, you must remember,
 And, John, I can't forget,
 When never foot of yours, John,
 Was in the alehouse set.
 Ah, those were happy times, John,
 No quarrels then we knew,
 And none were happier in our lane
 Than I, dear John, and you.
 Then don't go in to-night !

You will not go ! John, John, I mind,
 When we were courting, few
 Had arm as strong, or step as firm,
 Or cheek as red as you :
 But drink has stolen your strength, John,
 And paled your cheek to white,
 Has tottering made your young firm tread,
 And bow'd your manly height.
 You'll not go in to-night !

You'll not go in! Think on the day
That made me, John, your wife,
What pleasant talk that day we had
Of all our future life!
Of how your steady earnings, John,
No wasting should consume,
But weekly some new comfort bring
To deck our happy room.

Then don't go in to-night!

To see us, John, as then we dress'd,
So tidy, clean, and neat,
Brought out all eyes to follow us
As we went down the street.
Ah, little thought our neighbours then,
And we as little thought,
That ever, John, to rags like these
By drink we should be brought.

You won't go in to-night!

And will you go? If not for me,
Yet for your baby stay!
You know, John, not a taste of food
Has passed my lips to-day;
And tell your father, little one,
'Tis mine your life hangs on;
You will not spend the shilling, John?
You'll give it him? Come, John,

Come home with us to-night!

W. C. BENNETT.

CAROLINE CHISHOLM.

an'-i-mate, *to make alive, to make active*

lux-u'-ri-ant, *abundant, growing freely*

viv'-id-ly, *in a lively manner*

ben'-e-fac-tor, *one who does good to others*

sym'-path-y, *a feeling for others*

re-nounced', *to give up entirely*

sta-tis'-tics, *accounts of numbers*

lib'-er-at-ed, *set free*

em'-i-grant, *one who leaves his native country to settle in another*

im'-mi-grant, *one who settles in a new country*

'Come, labour on!

The labourers are few, the field is wide,

New stations must be filled, and blanks supplied.

From voices distant far, or near at home,

The call is—Come!'

MANY and very varied are the spheres of usefulness which good women have found. Some have lived and worked unknown to fame; while the deeds of others, being of a more public character, are deservedly recorded. Circumstances alone must determine to which class each one of us shall belong; but it is for us to see that we are animated by the spirit which influenced both.

Amongst those who have been *public* benefactors, we should not forget the name of Caroline Chisholm. She is one of those women of whom England may well be proud, and whose work will be remembered as long as emigration lasts. The improvement in the emigrant's position on landing, and the comfort enjoyed on the voyage, are the results of her active benevolence.

Caroline Chisholm was born in Northamptonshire, and there, far away from the sea, she received her first ideas on the subject of emigration.

An old soldier, to whom the children were ever ready to listen, told them long tales of countries far away. He talked of the places to which he had

been, and pictured, in glowing colours, their beautiful scenery, their luxuriant vegetation, and the ease with which comfort might be secured, if only people would colonize them. Young as Caroline was at the time, these descriptions impressed her most vividly. To such an extent did she, in her childish way, study the subject of emigration, that her very play took its tone from it. Her dolls became emigrants, bean pods were converted into boats, and a wash-hand basin filled with water supplied the necessary ocean.

As she grew older, however, other things occupied her attention. The time which many girls give to amusement she spent in ministering to the wants of the sick and poor around her. From this she derived real pleasure—pleasure of a far higher and more lasting character than that of those who only seek to please themselves.

At the age of twenty she became the wife of Captain Chisholm, and a few years afterwards accompanied him to India.

There Mrs. Chisholm found a fresh sphere of useful labour amongst the soldiers' daughters. Hitherto these girls had, for the most part, spent their time in idleness and folly, and they consequently grew up utterly ignorant of the most common branches of a woman's education. Now, however, a school was established by Mrs. Chisholm, in which they received instruction in housekeeping in addition to the subjects generally taught.

This school soon grew into a home, in which they learned to do all that was necessary to make a home comfortable. Thus was laid the foundation of the Orphanage which has since proved such a blessing to India.

After some time the illness of her husband called Mrs. Chisholm away from this labour of love to Australia. In her new home, at Sydney, she soon

found fresh opportunities of doing good. No change of circumstances could prevent her from being the benefactor of her race. The *will* to do good remained unchanged: the *way* alone was altered.

The new way was but the carrying out of her old childish ideas on the subject of colonization. She saw, with sorrow, the wretched accommodation provided for emigrants while on the voyage, and, with still deeper sorrow, the fate of many of them on landing. For young girls, alone and unprotected, homeless and friendless, her deepest sympathy was called forth. She knew that for many a one it would have been well had the sea become her grave. In pity she took many of these homeless wanderers to her own home, and kept them there till she could obtain situations for them.

Mrs. Chisholm next applied for help to the ladies of the colony, and under her direction they formed a committee to enquire into the condition of female emigrants, and to adopt the best methods of helping them. Application was made to the Governor of the colony for aid in the work, and after a time a room was given as a home for the emigrants on arriving.

The task of converting an empty room, infested with rats, into a comfortable abode was undertaken and accomplished by Mrs. Chisholm. Other homes were soon added to this in Sydney, as well as in many other towns of the colony. These homes furnished the emigrants with shelter and protection, and finally with situations.

The good accomplished in this way was of a character not to be represented by mere statistics. Some idea of its extent, however, may be derived from the fact that in seven years eleven thousand immigrants were thus provided for.

Charity such as Mrs. Chisholm's was not likely to

rest here. It extended to the liberated convicts also. For them, by earnest appeals to the Government, she obtained the greatest boon that could be granted them. It was that their wives and children should be sent out to them, and many a man started afresh in the world with such a motive for renouncing crime. Often she travelled hundreds of miles into the country to secure situations for the objects of her beneficence. On visiting England, in 1846, she still continued to work for them, representing the necessity of exertion to Earl Grey, and thus to the Government. Much has been done in consequence, by the nation and by individuals, to carry out that noble work, which owes its origin and much of its success to Mrs. Chisholm.

FRUITS: AND METHODS OF PRESERVING THEM.

pro-mot'-ing, <i>helping forward,</i>	ac-cept'-a-ble, <i>worthy, pleasing</i>
<i>assisting</i>	dif-fus'-ed, <i>spread, scattered</i>
whole'-some, <i>healthful</i>	ex-per'-i-ment, <i>a trial</i>
pal'-at-a-ble, <i>pleasing to the taste</i>	ben-e-fi'-cial, <i>useful, doing good</i>
es-teem'-ed, <i>valued</i>	al-lay', <i>to soothe, to relieve</i>
a-cid'-i-ty, <i>sharpness of taste</i>	e-co-nom'-i-cal, <i>inexpensive, saving</i>
in-stinct'-ive, <i>natural, coming by</i>	ex-clud'-ed, <i>shut out</i>
<i>instinct</i>	

WHAT an endless variety of substances is provided by nature for promoting the growth, health, and comfort of our bodies!

Among these substances perhaps none are more wholesome, palatable, and generally esteemed, than fruits.

The juiciness and exquisite flavour of some kinds; the grateful acidity of others; their abundance and

cheapness, and the ease with which they are prepared for use, combine to render them a very general and acceptable food among both the rich and the poor.

The fact that there exists, almost universally, an instinctive craving for fruits, which are widely diffused through the various countries and climates of the world, induces the conviction that they were intended by the Creator to play an important part in the formation and sustaining of man's bodily structure.

Scientific experiments have proved this conviction to be a true one, and the fact is established beyond doubt that fruits not only form a pleasant and agreeable addition to our repasts, but are extremely beneficial in strengthening the frame, purifying the blood, and cooling the system; in allaying thirst, and acting as a preventive of fever, eruptive diseases, and many other evils, especially those to which the body is liable during the, often, excessive heat of summer.

If, however, eaten immoderately, or when unripe, they are extremely indigestible, and tend to produce, rather than to prevent or mitigate, disease.

Fruits are prepared for food in various ways. When in season, they are generally sent to table without cooking, or used in making fresh fruit pies or puddings.

In the former case care should be taken to send them to table as fresh and perfect as possible. With wall fruit, such as peaches, great caution is needed in handling them, so as not to destroy the rich bloom upon them.

In boiling or baking fruits should be subjected to moderate heat, and be cooked slowly. A little sugar, added before cooking, greatly lessens the acidity of

the fruit, and is more economical than when applied to it afterwards.

In order to have a supply after the season has passed, fruits are preserved in various ways. Cherries and other stone-fruits are often preserved in brandy. If the air is carefully excluded, fruits may be kept for a long time in this way.

Gooseberries, currants, and similar fruits, are often kept as stock for pies and puddings by putting them into air-tight bottles, placing these in cold water, and then boiling them for some hours. Preserved thus, the fruits taste very much like fresh fruit.

But the most common modes of preserving fruits are, preparing them with sugar, as candied fruits, jams, and jellies; and drying them.

Fruits intended for preserving as jams should be gathered before quite ripe, as they then require less sugar, and are less likely to ferment. They should always be gathered on a dry day. About three-quarters of a pound of sugar should be used to each pound of fruit. The sugar and fruit should be boiled together in a brass pan, and be kept simmering for about half an hour after it commences boiling. It should then be poured into stone jars, and, when set, made air-tight by tying skin or paper, previously dipped in brandy, over the jars. The jars must be kept in a perfectly dry, cool place, or the preserves will become mouldy and unfit for use. Fruits preserved in this way are generally used for making pastry, puddings, &c. They form an exceedingly palatable and economical article of diet, and are very useful in the preparation of cooling drinks, and for moistening the throat. Used with bread, they form an excellent substitute for butter.

Candied fruits are either eaten as confections or employed in flavouring cakes, puddings, &c., as in

the case of candied lemon, citron, and orange. Dried fruits are usually imported from foreign countries. They are far more indigestible than fresh fruits, and when used in cookery require to be subjected to long and continued boiling.

The rind and kernels of fruits should not be eaten, especially those of stone-fruit, as plums and peaches. Apples and pears may be preserved by storing them on the floor of a warm, dry room. Walnuts are usually kept in sawdust.

Taken in moderation, and at fitting times, fruits are exceedingly beneficial, but we must remember that, like most other blessings, they become, when misused, or indulged in to excess, positive evils, bringing pain and discomfort instead of health and pleasure, so that, even when partaking of these tempting articles of food, moderation is always best.

S. C. C.

DESERTS.

in-nu'-mer-a-ble, <i>too many to be counted</i>	car-a-van', <i>a body of travellers united for mutual protection</i>
op-press'-ive, <i>pressing heavily on one's spirits</i>	en-cour'-age, <i>to cheer</i>
lan'-guid, <i>faint, weary</i>	o-ver-whelm', <i>to cover, to crush underneath</i>
plain'-tive, <i>wailing, moaning</i>	

WE who live in England cannot easily imagine the misery of travelling through the desert. Our land is so green and pleasant, and the weather is, in general, so mild, that it is almost beyond our power to realize a wild, weary waste of burning sand. Yet a large part of North Africa is such a desert. No lofty mountains with stores of ice and snow are there. Hence there are few or no rivers to water

the thirsty land, and the sun looks down in all his fierceness upon the bare soil.

In our country the soil is firmly knitted together by innumerable roots of grass, and trees, and shrubs; but in the desert the soil is reduced to dust and sand, which the wind raises and whirls hither and thither.

Yet there are parts of the desert where the soil is firm, for the intense heat itself will bake the sand into a solid stone; and there are parts which are pebbly or rocky.

And there are some spots of life and pleasantness among all this desolation. The lowest parts have generally a few wells, and round the wells some scanty herbage. Were it not so, no one could cross the desert, for it is of very vast extent.

Fertile lands lie on both sides of it, Morocco to the north, Guinea to the south. Between these lands, caravans continually pass and repass. The journey is a terrible one. No fresh supplies of food can be obtained for 1,000 miles. The wells lie at least a day's journey apart, and the camels have often to do without water for eight days.

And the caravans do not pursue the best track through the desert, for there are parts where the wells are not far from each other, and coarse grass grows, which is food for a few sheep and goats. But the wild tribes who live there rob and destroy the caravans whenever they are able, and hence the merchants choose a more lonely and difficult but safer way.

Very few Europeans have crossed the desert. Those who have, give accounts which are very terrible, although very interesting.

A French traveller made the journey from Guinea, in the south, to Morocco, in the north. Soon after leaving Timbuctoo, which is on the great River Niger, he and his fellow travellers reached the skirts

of the desert. The camels were laden with ivory, gums, &c., and with negro slaves who were going to be sold in the Morocco slave-market.

Round the wells of Mourat were gathered 14,000 camels. Out in the distance nothing was to be seen but shining sand, and the camels uttered long moans as they looked out over it. They knew it too well, poor beasts. They took deep draughts at the wells, for there would be no more for eight days.

When they started the poor French traveller was driven almost mad with thirst. His mind was filled with images of running brooks, and he could think of nothing except of the pleasure of the next drinking-time. Water was served out to each one about twice a day, and seemed only to provoke thirst still more.

During the day the wind blew, sometimes a gale, and always from the east. It was dry and burning, and often loaded with fine dust. The night was calm, and they often travelled then, yet the heat seemed as great and oppressive as by day.

Some of the men walked by the side of the camels and sang songs to encourage them. But as day by day went by, and the poor creatures got neither food nor drink, their steps became languid, the men, too, were silent, and nothing could be heard but the soft, steady pacing of the camel.

Once, as they were encamped, a great sandstorm came on. The strong winds raised great pillars of sand, such as often overwhelm and bury whole caravans. Some of these pillars broke into their camp, overturned their tents, and tossed the people one against the other. All of them lay upon their faces, and each man called upon his god to help him. In the pauses of the storm the plaintive moans of the poor camels could be heard, for they had not had food or water for four days.

At length some wells were reached, and the camels grew quite unmanageable. The wells were filled with sand, and had to be scooped out afresh, and the water was warm and salt, yet the camels seemed never to have had enough, and fought over the very last drops.

Then they passed on, and had to endure other storms, which seemed to blot out the sun at noon-day, and which were poisonous also, so that they were obliged to guard both nose and mouth against the wind. Through such miseries, and many others, did they at last reach fruitful lands again.

R. McW.

PRINTING.

man'-u-script, <i>that which is</i> <i>written by hand</i>	rap'-id-ly, <i>quickly</i>
to'-tal-ly, <i>wholly</i>	com-part'-ment, <i>a separate division</i>
en-dur'-ing, <i>lasting</i>	in-va'-ri-a-bly, <i>always</i>
typ-o'-graph-y, <i>the art of printing</i>	u'-ni-form, <i>equal, even</i>
<i>with type</i>	trans-fer', <i>to remove a thing from</i> <i>one place to another</i>
in-ge'-ni-ous, <i>skilful in inventing</i> <i>things</i>	fi'-nal-ly, <i>at last</i>

THE invention of printing must be considered one of the greatest inventions in the history of our world. Perhaps of all inventions it has been productive of most good to the human race. By its means books of every kind have been multiplied to an enormous extent, and the rich and poor alike are enabled to gain information upon all subjects. Five hundred years ago there was not a printed book in the world, and the labour required to write copies of manuscripts made them so expensive, that only the very wealthy could have them, and the possessor

of one counted it one of his greatest treasures; consequently, only the very rich and the very learned read, and the mass of the people were totally ignorant, and were obliged to be content with whatever teachings they could get from these men, who were generally their religious teachers.

It was with the assistance of printing that the Bible became more read and known among the people of Europe, and that the great Reformation spread in England and Germany. The pure Word of God and other good books were scattered among the people, and thus they learnt for themselves many things which had been hidden from them by their former teachers. Before printing was discovered the wages of a working man for a year would not purchase a Bible; now he can get one for much less than he earns in a day.

The most ancient way of recording events was by engraving on stone, or some other hard substance; but for the purpose of carrying about, the leaves or inner bark of trees were used; after this, parchment came into use, and was valued for its enduring qualities; but upon all these materials words were written.

Printing, that we are to talk about, is the art of producing letters on paper with moveable metal or wooden types, and is, therefore, sometimes called typography.

It is certain that the nearest approach to this art was made by the Chinese, who, it is acknowledged, practised printing from wooden blocks nearly 500 years before it was known in Europe. They still keep to the same method, which is this:—the work intended to be printed is written upon thin, transparent paper; each sheet is glued, with its face downwards, upon a smooth block of wood, and the engraver cuts away all those parts where he finds

nothing traced, and this leaves the written parts ready for printing. By this method there must be as many blocks as pages, and they are not of the least use in printing other books. This style was used in Europe as early as the thirteenth century, especially in producing books with images with sometimes a text from the Bible.

The first person who used moveable types was Lawrence Coster, a native of Haerlem, who is said to have amused himself by cutting out separate letters of wood, and printing from them verses and short sentences. But to John Guttenberg, of the town of Mentz, belongs the honour of setting up the first printing-press, and to a son-in-law of his that of inventing a method of casting types, each letter having formerly been cut in wood or metal. The oldest work of any size printed by these men is a Latin Bible, which bears the date 1455. These early printers of the Bible, however, met with great opposition.

In the early history of printing, the most learned men were proud to take a part in it, and the invention rapidly extended all over Europe. It was first introduced into England by William Caxton, who established a press in Westminster Abbey about 1473. He was a learned, industrious, and ingenious man, who was a merchant in London, and afterwards spent several years travelling in Europe; and it was while in Flanders that he made himself master of the art of printing. The first book he published is said to have been 'The Game of Chess.' From that time to the present, many improvements have been made, until the art has arrived at its present perfection.

Now to give you some idea how books are printed. Every letter, point, or mark, with one or two exceptions, is cast separately, and placed in small com-

partments in a case which is mounted on a stand—a frame. When a book is to be printed, the written copy is given to a man, called a compositor, who places it before him; in his left hand he holds a frame of metal called a composing stick, which he can make larger or smaller, according to the size of the page. He then lifts out the letters from their little cells, and places them in a line in his frame until it is full; these are now carefully slipped out and slidden on to a long flat board with a ledge round it, and the same process is continued until one or more pages have been completed. You would be astonished to see how rapidly a good workman places the letters. When the ledged board is full, the compositor ties a cord round it to bind the types closely together, and places it on an iron or stone table for the pages to be arranged in their proper order. After this, it is placed in an iron frame called a chase, and wedges driven in to secure the letters tightly, and several other small matters done. When the book is to be stereotyped, as is now usually done, a mould of plaster of Paris is taken of the pages which form one sheet, and the whole cast in type-metal, the cast being one solid plate. After this has been done, it is the duty of the compositor to undo his work and distribute the letters in their proper boxes, and as much skill and accuracy is required as in setting them up. Some very ingenious machines have been invented for composing, but have as yet only partially succeeded.

This solid plate—or forme, as it is termed—is now handed over to the pressman to be printed, and this is done either by the hand-press or by printing-machines. When only small matters are printed, in country offices, the press is used, but in large establishments, where newspapers and large quantities of books are done, machines are invariably employed. The

paper on which the printing is to be done is first damped and then put into a screw-press, in order that the degree of dampness may be uniform; it is then placed in such a position that it is brought down by the pressman over the forme. The types are now inked, and this is done by a roller made of hard wood, and covered with a composition of treacle and glue. The ink is on an iron table; the roller is rolled over it, and then over the forme, on which the paper is then laid; the pressman, by using a handle, brings over it a heavy weight called a camage, and when this is taken away, an impression of the forme remains on the paper; in other words it is printed.

To work these hand-presses great labour is required, and it is rather a slow process. Machines have therefore been invented, which perform all the processes, only requiring men to feed them with paper. You can form some idea of the work done by one of the best machines when I tell you that in the *Times* Newspaper Office, a machine is at work which requires ten men to supply it with paper, and will print many thousand impressions in an hour.

The printed sheets are transferred from the press to the warehouse in the case of books, and are hung up exposed to the air for some time. They are then pressed, counted, parcelled up, and finally handed to the bookbinder.

J. W.

MY CHILD.

van'-ish, <i>to go out of sight</i>	beam'-ing, <i>shining</i>
ward'-robe, <i>a place in which</i>	rai-ment, <i>dress</i>
<i>clothes are kept</i>	de-spair', <i>to give up hope</i>
satch'-el, <i>a little sack, a bag for</i>	chast'-en, <i>to punish</i>
<i>books</i>	

I CANNOT make him dead !
 His fair sunshiny head
 Is ever bounding round my study chair ;
 Yet when my eyes, now dim
 With tears, I turn to him,
 The vision vanishes—he is not there !

I walk my parlour floor,
 And through the open door,
 I hear a footfall on the chamber stair ;
 I'm stepping toward the hall
 To give the boy a call ;
 And then bethink me that—he is not there !

I thread the crowded street ;
 A satchell'd lad I meet,
 With the same beaming eyes and colour'd hair
 And, as he's running by,
 Follow him with my eye,
 Scarcely believing that—he is not there !

I know his face is hid
 Under the coffin lid ;
 Closed are his eyes ; cold is his forehead fair ;
 My hand that marble felt ;
 O'er it in prayer I knelt ;
 Yet my heart whispers that—he is not there !

I cannot make him dead !
When passing by the bed,
So long watch'd over with parental care,
My spirit and my eye
Seek it enquiringly,
Before the thought comes that—he is not there.

When at the cool, gray break
Of day, from sleep I wake,
With my first breathing of the morning air
My soul goes up, with joy ;
To Him who gave my boy,
Then comes the sad thought that—he is not
there !

When at the day's calm close,
Before we seek repose,
I'm with his mother, offering up our prayer ;
Whate'er I may be saying,
I am, in spirit, praying
For our boy's spirit, though—he is not there !

Not there ! Where, then, is he ?
The form I used to see
Was but the raiment that he used to wear.
The grave, that now doth press
Upon his cast-off dress,
Is but his wardrobe lock'd—he is not there !

He lives !—In all the past
He lives ; nor to the last,
Of seeing him again will I despair ;
In dreams I see him now ;
And on his angel brow,
I see is written, 'Thou shalt see me there !'

Yes, we all live to God!
 Father, thy chastening rod
 So help us thine afflicted ones, to bear,
 That, in thy spirit land,
 Meeting at thy right hand,
 'Twill be our heaven to find that—he is there!

JOHN PIERREPOINT.

RACES OF MEN.

ac-quire', to get, to obtain	in-hos'-pit-a-ble, cheerless
fac'-ul-ties, powers of the mind	re-puls'-ive, disagreeable to the
stat'-ure, height of the human	sight
body	serv'-i-tude, slavery
per-pet'-u-ate, to make lasting	can'-ni-bals, those who eat human
re-search'-es, enquiries made by	flesh
study	trans-form-a'-tion, change
phys'-ic-al, natural	pro-lif'-ic, fruitful, having many
in-tel-lec'-tu-al, relating to the	children
mind	e-nu'-mer-ate, to reckon, to number
at-tain', to reach to	

THE varieties of the human race are so numerous that it would require much space to give even a simple list of them, but there are some races which possess differences so marked and distinct as to give the characters by which the whole are separated into certain divisions.

In these the form of the skull, the colour of the skin, the character of the hair, &c. differ very widely, although it is well agreed that there is nothing in the differences that exist in stature, form of skull, features, or colour of skin which would prevent us from concluding that all mankind have descended from a single pair as related by Moses. Climate, food, habits of life, and other influences are quite sufficient to produce varieties, and, if continued, to cause them to be perpetuated. We have

only to look around us and we can see every day members of our own oval-headed white race whose skulls bear great resemblance to the more debased and savage races ; and amongst the coloured races we can often note those who vary from their type, and approach in form the white race. This tendency to vary, from one cause or another, confirms the conclusion previously expressed. Cuvier divided the human family into three races ; Blumenbach into five ; but Dr. Pritchard, whose researches are the most recent, classes them in seven.

These are, *first*, the nations whose skulls and physical characters resemble Europeans, including many in Asia, and some in Africa ; *secondly*, those resembling Calmucks, Mongols, and Chinese ; *thirdly*, the native Americans, including the Esquimaux ; *fourthly*, the Hottentots and Bushmen ; *fifthly*, the Negroes ; *sixthly*, the Papuans, or woolly-haired and other tribes of Polynesia ; and *seventhly*, the Alfourens and Australians.

The *first*, or white race, are pre-eminent for their physical powers, beautiful person, and intellectual superiority, and it is amongst them that civilization and the arts and sciences have made the most progress, and attained the highest perfection. But amongst them there are great differences. We have the fair-haired and ruddy Saxons, the swarthy Spaniards and Italians, the sallow Turks, the finely-formed Circassians and Georgians, celebrated for their personal beauty, the dark Afghans and still darker Hindoos, and many others.

In the *second* we have the Calmucks and Tartars, inhabiting the rugged countries and extensive plains of central Asia, who wander about with their enormous flocks of sheep and droves of horses ; the inhabitants of Thibet, of which country we know so little, and the numerous and industrious Chinese.

The latter possess a high degree of civilization, have attained a great skill in the arts, were the inventors of the mariner's compass, and yet have not progressed in either the arts or sciences. We are, however, much indebted to them for their patient industry, especially in the production of tea and silk.

The *third* race includes the Red Indians of North America, a fine, hardy race, most of them wandering about, and obtaining food by means of hunting wild animals, especially deer and bison. With them also are the Esquimaux, a race short in stature, as though stunted by the cold and inhospitable climate of their country, which borders on the Arctic regions. They live entirely on animal food, clothe themselves in the skins of animals, use dogs to draw their sledges, and build themselves substantial houses of frozen snow, in which they pass their long Arctic winter.

In the *fourth* race are the Hottentots of South Africa, a repulsive people, with olive brown complexions, wide nostrils, thick lips; possessing a low intelligence, which, however, under kind teaching, is capable of improvement, but who, in their native condition, live more like animals than human beings; gorging themselves with food when it is plentiful till they can scarcely move, and wearing no garments but a strip of cloth round the loins. With them, too, and inhabiting the same country, are the Bushmen and Earthmen, beings the very lowest in the scale, living like wild animals in thickets and holes in the earth, their highest thoughts being only how to supply their appetites.

The *fifth* is the numerous and once greatly oppressed nation of the Negroes. Their well-known characteristics are their dark skin, approaching black, short, black, woolly hair, high cheek-bones, projecting jaws, and thick prominent lips. They are a patient, long-suffering people, accustomed to servi-

tude both from their own chiefs and their white oppressors. They are a numerous and prolific race, inhabiting chiefly the northern and central parts of Africa. The Caffres and Fingoes of southern Africa vary a little, in having not so dark a complexion and less prominent jaws and lips, and are more fierce and warlike in their dispositions.

The *sixth* race comprises people who greatly differ both in appearance and character. We have first the Papuans, inhabiting New Guinea, of small stature and sooty skins, and remarkable for their woolly frizzled hair, resembling mops; and there is also a lighter race of olive or brown complexions, and straight hair. This includes the Malays, and the numerous tribes inhabiting the lovely islands of the South Seas. Many of these latter are finely formed, and possess a large amount of personal beauty, but in their natural condition are cruel and savage cannibals. Christianity has however, through the exertions of the missionaries, wrought wonders in the transformation of many of these people; and industry, morality, and religion have taken the place of the idleness, licentiousness, and most degrading superstitions of New Guinea.

The *seventh* division includes the Alfourons and natives of Australia. These, though greatly partaking of the character of the Negro, especially in the colour of the skin, yet differ from them in many important points. They stand very low in the scale of intelligence, having few traces of religion or the worship of a superior Being, and wearing little or no clothing. They are, moreover, cruel and degraded in their habits. They are not a prolific race, and are gradually diminishing in numbers.

Besides those enumerated there are a great many intermediate races in all parts of the world, partaking partly of the characteristics of one, and partly of those

of another ; but, however widely these various peoples may differ from each other, we must agree with Dr. Pritchard 'that the sentiments, feelings, sympathies, internal consciousness, and mind, and the habits of life and action thence resulting, are the real and essential characteristics of humanity, and prove that man is the special work of God's hand, and not the development of the brute.'

W. J. S.

HAIL AND SNOW.

oc-cur'-rence, *an event*
 con-geal'-ed, *frozen*
 mi'-cro-scope, *an instrument for magnifying small objects*
 sub'-sti-tute, *to put one thing in place of another*
 lat'-i-tude, *the distance of a place north or south of the equator*
 ir-re-sist'-i-ble, *not to be withstood*
 por'-ous, *full of small holes*

com-bin'-ed, *joined, united*
 ac-cu'-mu-late, *to heap up*
 sum'-mit, *the top*
 in-tol'-er-a-ble, *not to be borne*
 per-pet'-u-al, *everlasting*
 dis-as'-ter, *a misfortune*
 tem'-per-a-ture, *warmth of the air*
 av'-a-lanche, *a mass of snow falling from a mountain*

In a summer storm of thunder and lightning, we very frequently find the heavy splash of the great rain-drops suddenly changed for, or mingled with, the pelting clatter and rattle of hail ; and the ground becomes strewn with whitish-looking particles of ice, or hailstones as they are called. These are of various sizes and shapes, and rapidly dissolve into water after falling upon the warm earth. The peculiar facts of these icy morsels falling only in hot sultry weather—generally in the heat of the day, and always within a narrow limit as regards the space of the earth visited by any one shower of hail—have given rise to many opinions as to the origin of hail. It is generally supposed, however, that, in some manner connected with the electricity

contained in the clouds, an extreme coldness is produced in the air at a distance above the earth, and the rain-drops in passing through this cold space on their descent to the earth, are changed into hard icy hailstones.

It is seldom, in our own country, that these are so large as to cause any great damage in their fall; but in some parts of South America, in Spain, and many other warm countries of the earth, the hailstones are frequently of such great size and weight, and fall so violently, as to break the windows and roofs of the houses, while in the open country it is a common occurrence for numbers of birds and even young lambs to be found lying dead upon the ground after a heavy storm.

Snow is another form of rain congealed in its passage through the cold upper air, or rather, of congealed moisture before it has become actually changed from its cloud state, and formed into drops.

What is more beautiful than snow? Take the flakes one by one as they lightly dance or gently glide downwards through the air. Seen through a microscope every one is a beautiful, regularly-shaped crystal, and scarcely two are to be found alike. They seem to say as we look in wonder and delight upon their sparkling, starlike beauty, 'The hand that made us is divine.' Or, looking at snow in a body, in what other aspect does the earth present such a picture of purity and beauty as when clothed in its warm winter mantle of snow? Nothing in nature is made in vain; the beautiful and the useful are combined in this as in all things else; for the snow which clothes the naked earth and leafless trees with beauty, at the same time serves as a warm blanket to protect the seeds and roots of plants from being destroyed by the nipping frost or

biting winter winds. Besides, accumulating as it does on the summits of mountains, where it remains unmelted for weeks and months, it affords, when at last it becomes thawed by the summer's sun, the needful supply of water to the springs and rivers so necessary to the well-being of all living things.

When the mountains are situated in the very hot countries of the globe, the wind blowing over their snowy tops becomes cooled and freshened; and by these means districts which would be almost intolerably hot are tempered and rendered healthy and pleasant, and fit for the habitation of man.

In many warm parts of the world, snow is never seen except upon the cold mountain-tops. Snow certainly falls from the clouds, reaches the high hills and remains there as snow; but before it arrives upon the level ground, it is changed by the warmth of the air into rain; consequently, there are thousands of people inhabiting warm climates to whom snow is unknown; on the other hand, in extreme northern latitudes, so great is the difference of temperature, that the earth is deeply covered with snow all the year round.

The Esquimaux, who have their native home in this dreary region, build their huts of snow-blocks, and for panes of glass cleverly substitute sheets of ice. Farther south, in Iceland, Lapland, and Norway, where dreary winter reigns for nine months in the year, the earth is covered with one sheet of snow, and all travelling is carried on by means of sledges drawn by the swift, sure-footed reindeer, which find their food in the mosses or lichens growing underneath. In Canada, the adopted home of so many English emigrants, and in Russia, too, sledges are much used in travelling over the frozen snow, which usually remains upon the ground for four or five months at a time.

Great Britain, though subject to severe snow-storms, especially in the north, where Scotch shepherds and their flocks are sometimes lost and perish in the snow, has no mountain so high as to be always covered; yet, on the Continent, in a much warmer latitude, there are large mountain districts of perpetual snow and ice. This is especially the case with the Alps, where terrible disasters sometimes occur from the falling of heavy blocks of snow into the valleys beneath. Those mountains whose tops are always covered with snow are said to rise above the line of perpetual snow. During the winter, snow falls on the mountain heights in enormous quantities, where it remains until, perhaps by its own weight, perhaps by the action of the wind, it becomes loosened from the sloping ground on which it rests, and dashes with tremendous force down the mountain sides. Travellers and houses are buried, trees uprooted, and sometimes even whole villages overwhelmed by the irresistible crushing force of the mighty avalanche as it comes thundering down. Great and terrible as these disasters are, they are not often so fatal to life as might be imagined. Sixty out of a hundred people have been dug out alive after having been buried under an avalanche for several days; because, from the porous nature of the snow, they were able to obtain sufficient air to support life.

M. M. W.

MAKING CLOTHING.

CUTTING OUT.

ac-com'plish-ment, <i>an ornament of mind or body</i>	ex-pert', <i>skilful, clever</i>
prac'ti-cal-ly, <i>as regards the use of a thing</i>	de-pos'-it, <i>to put or place</i>
ex-trav'-a-gant, <i>too great, excessive</i>	di-min'-ish, <i>to make less</i>
di-a'-gon-al-ly, <i>from corner to corner</i>	re-quire'-ment, <i>what is wanted</i>
	tri-an'-gu-lar, <i>three-cornered, like a triangle</i>
	verb'-al, <i>expressed in words</i>

NEEDLEWORK has always been considered one of the most important of a woman's employments, and its skilful performance one of her best accomplishments. A family would have little chance of real comfort or respectability if the women belonging to it had no knowledge of this useful art. They might be well educated in other respects, intellectual, and clever; they might be able to converse agreeably, and even be accomplished in music or painting, but if the family presented to view the wretched spectacle of ragged clothing, toes and heels peeping out of stockings, shirts without buttons, collars with jagged edges, frocks hookless and buttonless, ragged shirts and draggling flounces, the whole family, men, women, and children, would be objects of ridicule, and everyone would avoid their companionship. But the blame and disgrace are with the women and girls, who ought to keep their own and the men's clothing neat and whole, but either cannot or will not. It is true that ready-made clothing can now be bought at a much cheaper rate than formerly; but clothing soon gets out of repair, especially that which is machine-made. When some slight damage is done to a garment, a few stitches or a well-put-on patch or neat darn will make the article practically as good as new, whereas, if this be

neglected, the rent is quickly enlarged, and the garment soon completely spoilt. Thus, an extravagant outlay is incurred without insuring a respectable appearance. It is no exaggeration to say that a woman who can cut out, make, and mend her own and children's clothes, will dress the family well on half the money which would be required if she had to pay for all the making and mending. It is very well for rich persons to employ needlewomen, and there are other women who go out to work, and consequently have no time to do more than repair their clothes; but the vast number of women who do not belong to the wealthy classes, and yet are at home all day, should make themselves thoroughly acquainted with the arts of cutting out and fitting all common articles, and making them with taste and neatness. Many girls can sew neatly, and yet have no idea how to cut out even the commonest article of clothing, or even to fix it, and they are apt to think that because they have not done it they cannot do it; but intelligent observation and practice will soon enable anyone to become expert in preparing needlework. The object of this lesson is to give a few useful hints on the subject, which will assist girls willing to try.

Some persons are awkward in holding the scissors; for want of a firm and steady hold, the scissors slip, and the cut is uneven. The cloth should be laid upon a table, sufficiently large for the length to be cut without moving the piece. The scissors should be moderately large—from five to eight inches long will be generally useful—the thumb and fourth finger of the right hand should be placed through the bows, the under side of the broad-rounded half of the scissors should rest upon the table to insure firmness. The learner should practise cutti-

straight or curved lines on paper before trying on more costly material.

A learner should never cut out by guess. The article should be accurately planned before the cloth is touched with the scissors. For want of observing this rule, much material is often wasted; the article does not fit well—the neck is too high or too low, the width across the chest is insufficient, sleeves are made too short, the two sides are often unlike—and so, either the material is quite wasted or the garment is a source of discomfort to the wearer. Let the learner get a good pattern—one cut out in paper is the best—but if this is not to be had, she should get an old garment of the size and shape required, and carefully take it to pieces. Let her then lay the pieces carefully on the cloth, observing ‘which way of the stuff’ each piece is to be cut, for some pieces require to be cut lengthways and some crossways. Let her pin every piece of the pattern carefully on the cloth, or mark round its edge with a lead pencil, or a piece of pipe-clay. Care should be taken to place the pieces so close together that no unnecessary waste of material is made, for a number of odd-shaped pieces are of very little use. If two pieces are to be exactly similar, it is better to double the material, and cut both at once. The cutter should be sure to ascertain whether her pattern allows for turning in. Discretion must be used in regard to the quantity allowed for this. If it be too little, the seams are apt to break out; if too much, a wasteful cutting away after the seams are done is the result.

It is a very good plan for a girl to practise each article on paper before trying her scissors on expensive material. Let her choose a simple article, such as a child’s pinafore for her first effort. The plainest kind only requires the shoulders to be cut,

two small gussets inserted above the shoulders, and the neck hollowed a little. But there are many pretty patterns for pinafores which a clever girl will be delighted to make. Whenever she has got a good pattern she should keep it, wrapping it up carefully, labelling it with the name of the article, and depositing it in her workbox so that she can find it next time she may want it.

Dresses, babies'-pinafores, drawers, jackets, and the shaped-sleeves and French-gussets of shirts and night-gowns should never be cut without a pattern. Sometimes the pattern needs to be enlarged or diminished, for it is unreasonable to suppose that the same pattern will fit every one, or even the same person at all times. If the garment is to be made less than the pattern, a piece should be turned down all round the edge; if it is to be larger, it is best to pin on the pattern, and run a line an inch or two all round it, according to requirement.

Some articles, as chemises and night-gowns, require to be gored; that is, triangular-shaped pieces are sewn to the straight sides in order to make the bottom of the garment wider than the top. In night-gowns, the gores are separately cut and added to the full width of the calico; in chemises, which do not need to be so large, the pieces are cut from the upper end to add to the lower, so that one width of calico or linen is enough. There are several equally good ways of cutting these gores, but it would be difficult to understand any mere verbal description. The learner had much better ask her teacher or her mother to show her in the first instance, and then practise it herself. After the gores have been cut, the top of the chemise will be three-quarters of the width of the calico, while that of the bottom will be five-quarters. There are many different methods of making the tops and

sleeves of chemises. Usually, after the top has been properly shaped, it is gathered into a band, which should be made of five separate pieces, so joined as to fit round the shoulders.

Night-shirts consist of plain pieces. A straight piece, the full width of the cloth (about one yard), forms the body; its length, for a full-grown man, should be from one-and-a-half to two yards, according to the man's size; the sleeves should be about half a yard wide and three-quarters of a yard long; but, of course, allowance must be made for the size of the person. The size of the collar and wristbands must also depend on the person who is to wear them; but great care should be taken to make them large enough, as any pressure on any part of the body, especially the throat, during sleep is most dangerous. The binders should extend about two inches below the arm-hole. The neck-gussets and side-gussets are simple squares. Day-shirts must on no account be made without a pattern, as they require as great nicety of fit as a lady's dress.

Skirts, whether for dresses or petticoats, are usually gored. The front and back widths are generally made plain. The other widths, two, three, or four, according to the width both of the fabric and of the dress, are folded in three at top and bottom, and are cut diagonally from the first division at top to the second at bottom. All the wider parts are to be at the bottom; the sloped sides are to point to the back of the dress. As the sloped edges will be longer than the straight ones, they will, of course, not fit; but they should be made to fit at the top, and the pieces rounded off at the bottom; otherwise, they will hang in awkward-looking corners. Flannel petticoats should be made plain.

Cleverness, taste, and perseverance—above all, a

real desire to master what all must own to be a most useful art—will soon enable any woman or girl to cut out anything needed for common household needlework.

E. T.

WRECKED AND SAVED.

op-press'-ed, weighed down in	bound-less, without bounds or
<i>spirit</i>	<i>limits</i>
viv'-id, bright	shiv'-er, to split into pieces
de-spair', want of hope	be-nig'-nant, kind
a-main', with full force or speed	

THE day was fair, the sun was bright ;
 Our ship so gaily dress'd,
 All hearts were bounding with delight,
 Not one with fear oppress'd.
 The anchor weigh'd, each sail was spread
 To catch the fresh'ning breeze,
 And on our way we swiftly sped,
 Upon the boundless seas.

But soon a dreadful storm began,
 The vivid light'ning flash'd,
 The troubled seas like mountains ran,
 And loud the thunder crash'd.
 The raving waters swept the deck,
 And shiver'd ev'ry mast ;
 All sails were gone, the ship a wreck,
 And downward sinking fast.

Our Captain, calm, serene his brow,
 The fearful sentence gave ;
 ' We're lost, no pow'r can help us now,
 The sea must be our grave ! '

E'en then we wept not in despair,
 Tho' hope of life had flown,
 But rais'd one voice in holy prayer
 To Heaven's benignant throne.

The last farewell, the last good-bye,
 We gave, for death seem'd near ;
 When ho ! a sail ! a ship comes nigh !
 Thank God ! Thine aid is here.
 Hurrah ! we're saved ! now homeward bound,
 The ship speeds on amain,
 Soon shall our joyous shout resound
 In England once again.

J. BENDAHL.

EARTHQUAKES.

mys'-tic, mysterious
an-ni'-hil-at-ed, brought to nothing
sum'-mit, top
tre-mend'-ous, terrible
sub-sides', passes away, sinks
in-ev'-it-able, certain, not to be
altered
des'-tin-y, lot, fate
sub-ter-ra'-ne-an, under the earth
fran'-ti-cal-ly, furiously

de-press'-ed, cast down, lowered
chasm, an abyss, a deep rift in
the rocky crust
de-struc'-tion, ruin
com-mo'-tion, tumult
ge-o'-lo-gist, one who studies the
composition of the earth's crust
ir-rup'-tions, outbreaks
up-heave', to lift up

How green, how peaceful, how full of quiet beauty, is this earth of ours. Go out when the still stars are shining, and the moon is flooding all things with its mystic light. How deep and solemn is the quietude. It seems to hush the very soul to repose, to induce the feeling that in earth and sky there abides an eternal, unbroken calm.

You look at the strong hills standing proudly erect, their summits pointing skyward. You plant

your foot on the solid earth fearlessly. It is so firm, so strong; it seems impossible anything should disturb its security. And yet the calm goes, the hills remove, and the firm, strong earth is sometimes rent asunder. Nothing God has created is annihilated, but all things change, decay, die, though only, as we know, to rise again, probably to a higher service, and a nobler life. And we cannot believe the story spoken by the quiet, moonlit earth.

Ere long the quiet light will give place to darkness and the terrible tempest; still beauty, to the fierce grandeur of pealing thunder and the swift lightning's flash, withering and destroying earth's green loveliness and peace. Ah! what dire destruction, what a terrible wreck, out of which, nevertheless shall arise a new and more radiant loveliness, for all things are purged and beautified by the storm that cannot endure to see earth's dust and impurities dimming their heaven-lit splendour.

Yes, you know the *skies* will change and the *storm* will come, for you have seen them. But what will you say when I tell you that every giant mountain, every green-robed hill, changes too? Every day, every hour, the winds and storms are crumbling them down to dust; by-and-by they will not be seen, though others will arise in their stead as surely as these pass away.

But it is not always that hills and mountains pass *slowly* away. Sometimes, far swifter than the storm-clouds gather over the clear blue, a storm gathers that shakes, lays them low, or causes them to disappear utterly. How? Listen. You have seen tempests burst *over* the earth, but the earth is subject to other storms than these. Far down beneath the solid crust terrible storms rage. The fire-kindwells therepent up, repressed within the bowels of the earth, working like a giant, and producing

by fire-power wondrous gems, gold, silver, iron, and other precious things for us. But sometimes the fire-king declares that he will not be imprisoned longer, but will come up into the outer greenness and beauty to greet his kinsman, the sun, and he struggles to be free. Oh! how tremendous his struggles are. He rushes passionately against the enclosing rocks, and sometimes—Oh! joy to him; Oh! grief to the living things reposing on earth's green bosom—he finds a narrow way, up through some mountain's heart, out into the sunlight. So up he rushes, panting, furious, strong, tossing huge fragments of rock into the air as he goes, till, by-and-by, the top is gained, and then he pours himself, in a flood of burning ashes, or a river of liquid fire, down the mountain, over the fertile plains, burying or burning cities, villages, flocks, people—all things. And then, like a passionate creature that has spent its rage, he subsides again into quietude and darkness.

Not always, however, does he spend his rage in this way. Sometimes he finds no outlet, or none sufficient. He rushes hither and thither, waxing more passionately strong and furious, but everywhere the earth seems firm and will not allow escape. What now does the fire-king say? 'It is inevitable, I must accept my destiny, and be a prisoner always; my prison is too strong to be burst open?' Nay, he says, 'I will not stay here; I will burst my prison; I will fight; I will struggle; I *will* be free.' Oh! the sorrow, the misery now. Old earth, mindful of her trustful, reposing children, resting in her green loveliness, tries to hold her captive fast; but he pants and strives, and, ere long, earth's children feel that something is ailing their mother,—she shakes and trembles. What is it that alarms her? It is that dread demon within,

and they without cannot help her; nay, if she perish, they must perish too. They know it, and have barely time to cry out their anguish, ere, with deeper quakings, with dull mutterings, like subterranean thunder, the earth is torn asunder, houses topple over, shrieks of the dying fill the air, the sea moans, and rushes frantically towards the land. For a few moments all is loud cries, agony and confusion, and then houses, people, all things tumble into the yawning chasm. The earth closes again and covers her dead children from sight; and over the world men carry the story with sad faces and aching hearts, that there has been a terrible earthquake.

An earthquake is not always so fearfully destructive as this. Sometimes the earth is *shaken* only, not rent asunder; sometimes by its power the earth is pushed up far above the general level, forming whole ranges of hills or mountains, while in other parts the hills are depressed to, or below the surrounding surface. Usually, too, it is only a *part* of the earth, not the *whole globe*, which is shaken.

Often, however, the destruction is terrible. At Lisbon once, on a fair sunny day in 1755, an earthquake destroyed 20,000 people, and there are other instances equally sad.

Earthquakes are very frequent in South America, and in the islands of Western and Southern Asia.

In our own land we seldom feel the earthquake's awful power, though even here slight shocks are at times felt. In past ages there must have been fierce commotions within the earth, for geologists tell us that our hills and mountains were formed by them.

Fearful as earthquakes and volcanic eruptions are, they are not useless. Wise men say that to them we owe our rare gems and precious metals and minerals. Without them earth would never have possessed the grandeur and beauty of mountain,

hill, and valley that inspire the artist and the poet to paint and write pictures of loveliness and joy to cheer the eyes and hearts of other workers who cannot see them for themselves. What a flat, dull world this would become were there no force within it to upheave new mountain masses as the old ones decay! It would not be half so fair a home for us, even if we could then live on it, which is doubtful. Thus, you see, in God's creation all things have their work and use. The fierce storms, equally with the sweet sunshine, help to clothe earth with grass, flowers, and waving trees, and the terrible destroying earthquakes help to give form, and wealth, and beauty to it.

Let us remember that the terrible things, as well as the fair and pleasant ones, are God's blessings, sent to do good, and when *our* sunshine gives place to storms of sorrow, pain or disappointment, let us trust our Father, and be quite sure that He sends these things to take evil from us, and to make us better, happier, and more useful. If we wait and do not murmur we shall see the after-peace, and know that God does all things well.

S. C. C.

4

MAKING CLOTHING.

SEWING.

vi'-gi-lant-ly, <i>watchfully</i>	dis-trib'-ute, <i>to separate</i>
cor-rect'-ed, <i>set right</i>	ex-hib'-it, <i>to show</i>
char-ac-ter-is'-tic, <i>a particular</i>	ob-ject'-tion-a-ble, <i>faulty</i>
mark or sign	de-press'-ed, <i>pressed down</i>
sim'-il-ar, <i>alike</i>	com'-pe-tent, <i>able, skilful</i>
cred'-it-a-bly, <i>properly, deserving</i>	fa-tigu'-ing, <i>tiring</i>
credit	fac'-ul-ties, <i>powers of the mind</i>
al'-ter-nat-ing, <i>happening by</i>	or body
turns, <i>changing places</i>	

SEWING is one of those branches of learning which can only be acquired by practice. No one would dream of teaching a girl to sew in the first instance by giving her printed or written instructions how to do it; for, as each direction is given by the teacher, it should be at once practised by the pupil, and that practice should be vigilantly superintended in order that the many mistakes which are sure to occur may be corrected. We may assume that every girl who reads this lesson knows how to sew, for if she does not, no lesson, or set of lessons, which did not include performance on her own part, could teach her. But there are very many ways of doing everything; and there is always a very best method, and a standard of perfection for all practical work. It will be well, then, to consider some of the characteristics of the different kinds of needle-work, so as to be able to judge whether we are doing it in the best possible way.

The chief varieties of sewing are seaming, hemming, stitching, making button-holes, gathering, setting-in gathers, and darning. Besides these, which are essential in making any set of common clothing, there are certain ornamental stitches, as

hem-stitch and feather-stitch, to say nothing of those which are used for fancy work. We shall only speak of the plainer kinds.

In sewing seams the chief points which ought to be aimed at are strength and neatness. The former is secured by choosing thread of sufficient strength, fastening the ends of new threads securely by sewing them over, putting the stitches close enough together, and drawing the thread tight without breaking it. The latter is gained by making all the stitches exactly similar, and as small as is consistent with strength.

Hemming, like sewing, depends for its beauty chiefly on its regularity. Great care should be taken to take the stitches through to the other side, and to keep them on a thread if the work be a straight piece.

Very many girls who can do the more difficult kinds of work fairly, seam and hem very imperfectly, because they do not think such easy work worth much pains. But it is certain that no work, however humble, can be done creditably unless it is done carefully.

In back-stitching, the perfect regularity of the line and the equality of the stitches are greatly assisted by drawing a thread, and making each stitch take up exactly two threads of the material; but in stitching collars and wristbands a sloping or rounded line is frequently required. In such cases a line may be drawn with a lead pencil, or tacked with thread to keep the work even, but it is far better to learn to do it properly by the eye alone.

If the gathering be perfectly regular, and the gathers properly arranged by the operation called 'striking down,' there will be little difficulty in setting them in nicely, but the worker should be careful to divide both the gathered piece and the

band into a certain number of equal portions, so as properly to distribute the fulness, for nothing looks worse than to see bunches of gathers alternating with plain pieces.

The making of a good button-hole is considered a sure mark of a good worker. The hole or rather slit, must be cut perfectly straight with a pair of button-hole scissors. Common scissors may be used, but they are more likely to slip. The edge, which consists of a series of loops, should be firm, and should exhibit no flaw or break, as will certainly happen unless every loop be formed in the same manner. Of the various ways of making the ends of the button-holes, the straight bar is both the strongest and neatest, but is also the most difficult to make.

Herring-boning is a kind of cross-stitch, so named from its fancied resemblance to the back-bone of a herring. It is used for window-blinds, and for flannel work. It requires the work to be turned down only once, whereas for hemming it must be turned twice. It is therefore used where a thick turning would be objectionable. In this, as in button-hole making, the worker begins on the left-hand side instead of working from right to left.

Darning is a very useful thing for a girl to be able to do neatly. Where there is a large family there are always plenty of stockings to mend, and it is a great help to the mother if the daughters can assist her. Some persons mend their stockings very clumsily, drawing the edges of the holes together instead of filling them up neatly, using double worsted or cotton, and utterly neglecting the thin places. To mend stockings thoroughly, requires patience as well as skill.

First, the mender should run the stocking backwards and forwards the way of the material, not only

covering the hole completely, but including all that thin part which is always found on both sides of it when it has been made by wear. Then she must remember that the thread, especially worsted, will shrink in the wash, while the stocking, having already been washed, will not; so she must allow for this by not drawing the thread tightly through, but leaving a small loop at each end. After thus covering the hole and thin parts by lengthwise threads, she proceeds to cross them, passing her needle alternately above and below, just as in weaving, the shuttle passes through the alternate depressed and raised threads. In fact, darning is an exact imitation of weaving, or rather, weaving of darning. Many persons darn the toes and heels of new stockings, as it greatly strengthens them, but in this case the darning is not crossed. There are also beautiful patterns of darning used for repairing damask table-cloths and napkins, but these are usually only practised by very accomplished needle-women.

Girls would not grudge the time and pains which are needed to make them competent seamstresses if they could foresee the help and comfort the use of the needle will probably be to them in after-life, and the many griefs and temptations against which it will be a remedy. It is certain that a real pleasure always results from performing anything which we can do thoroughly, and who knows how many solitary hours may be cheered by this silent companionship, how many tedious days of recovery from sickness may be enlivened by it, and what temptations to gossiping, idleness, and all the countless mischiefs which spring from them, may be thus avoided? When the more active duties of the day are over, there often remain many unoccupied hours, which all have not the talent or inclination to spend in

reading or study, and which are consumed by idle women in roaming about from house to house, and gossiping about their neighbours' concerns. How great a blessing then is it to have a pursuit which is both useful and delightful, fatiguing neither to hand nor brain, which can be taken up for an odd half-hour and laid aside again without inconvenience, and which is at the same time so simple that the least intellectual can practise it successfully, while it presents to the taste and fancy of the more cultivated abundant scope for the exercise of the higher faculties of the mind !

E. T.

THE DIVER.

*cav'-ern, a hollow place
risk, to place in danger
sur'-face, the outside of a thing
Mam'-mon, the god of wealth*

*pro-found', deep, complete
treas'-ure, a store of riches
gasp, to breathe with difficulty
brink, the edge of a deep place*

IN the caverns deep of the ocean cold,
The diver is seeking a treasure of gold.
Risking his life for the spoil of a wreck,
Taking rich gems from the dead on her deck ;
And fearful such sights to the diver must be
Walking alone—in the depths of the sea !

He is now on the surface (he's gasping for breath),
So pale that he wants but the stillness of death,
To look like the forms he has left in the caves
Silent and cold 'neath the trembling waves.
How fearful such sights to the diver must be
Walking alone—in the depths of the sea.

And Mammon's the master and man is the slave
 Toiling for wealth on the brink of the grave ;
 Leaving a world of sunlight and sound,
 For night-like gloom and a silence profound ;
 And fearful the death of the diver must be
 Sleeping alone—in the depths of the sea.

G. DOUGLAS THOMPSON.

FELT MANUFACTURE.

com-bine', *to join together*
 com'-pact, *close*
 fric'-tion, *a rubbing*
 o-ri'-gin-ate, *to begin*
 con-vert'-ed, *changed*
 fab'-ri-cat-ed, *made*
 trem'-u-lous, *trembling, shaking*
 ser'-rat-ed, *notched like a saw*
 im-me-mor'-i-al, *that cannot be*
 remembered

vi-bra'-tion, *a shaking*
 e-las'-tic, *springy*
 al-ter-na'-tions, *changes*
 dur'-a-ble, *lasting*
 su-per-sede', *to set aside for*
 something else
 im-per'-vi-ous, *that does not*
 allow another substance to
 pass through it
 in-flam'-ma-ble, *easily set on fire*

FELTING is a process by which a material is formed from wool, or wool and fur combined, and is worked into a compact substance by means of heat, moisture, rolling, and pressure.

Little is known of the origin of felt. It is said that a monk, having used some carded wool instead of socks, found that by constant friction between the foot and shoe, the fibres became so matted as to produce a firm texture something like cloth, and that this originated the idea of the manufacture. There is also another explanation given, which appears to have a better claim to be believed. In ancient times the garments worn by Asiatic shepherds were formed of the skins of animals, rudely sewn together, and it is thought that the matting or interlacing property of these furry materials being

noticed, curiosity, or perhaps accident, would discover that this process might be further extended by beating or by pressure, and that a soft, pliable, and warm substance might be formed from the wool, and be conveniently converted into a suitable material for clothing. It is possible that the felting property of wool may have been discovered in this manner, and gone on improving. Felt may be described as a cloth made without weaving, and fabricated by taking advantage of the property of woolly fibres to entangle them together.

If we hold a hair firmly by the root and draw it gently between the finger and thumb, it makes scarcely any resistance, but suppose we reverse the motion, and draw our finger and thumb from point to root, there is a tremulous sort of resistance, and a motion from root to point. A fibre of wool, likewise, moves always in one direction. Wool, when examined, presents a crisped and curly appearance, which is much more apparent in some kinds than it is in others. When wool is seen through a microscope, it is found to have an irregular and feathered surface, and these jagged edges, by friction, become locked into each other. In every minute portion of wool, fur, and hair these serrated edges may be discovered, and this may explain the process of felting. When wool or fur is wrapped in a damp cloth, and rubbed and pressed in every direction, the agitation gives to each hair a motion towards the root, and the hairs becoming all closely entwined, the mass assumes a compact form.

All the materials used for felting, viz. the fur of the hare, rabbit, seal, beaver, and the wool of the sheep are mixed together. The fur is taken from the skins by means of a knife, but the wool is usually shorn from a living animal. The materials are thoroughly mixed by an operation called *bowing*,

which depends on the vibrations of an elastic string, the rapid alternations of its motion being peculiarly well adapted to remove all irregular knots among the fibres, and dispose them in a very light and uniform arrangement. When matted closely together, these materials, by means of the *carding* and *doffing* engines, are converted into a soft loose cloth. This is then wound on a roller, and carried to the felting machine, and by means of heat and pressure the fibres become more closely entwined, until the loose substance is converted into a compact and thick material, possessing great strength and durability. The process of felting consists mainly in rolling and pressing, first very gently, and at the common temperature, then with greater force, assisted by the action of warm acid liquor, and at last with the greatest possible force the workman can apply, and at a scalding temperature. Thus heat, moisture, and pressure, must be brought to bear upon the materials.

The principal use to which felt is applied is the making of hats, and that employed for this purpose is of the best and finest description. Felt hats were worn in England in the eighth century. In early times wool only was employed to make the felt, but in process of time, as trade with America became common, it was superseded by the fur of the beaver, and for many years fine beaver hats were worn by the higher and middle classes in Great Britain, and in the year 1830 it was calculated that a million beavers were killed every year to supply the hat trade of Europe. This led to a great scarcity of beaver fur, and silk was employed as a substitute for it, so that now scarcely any hats are made of beaver. Hats of felted wool, to which no nap is added, are much worn in the country, and for outdoor pursuits, as also for travelling.

The cuttings and waste woollen pieces in paper and other factories are formed into a stiff rough kind of felt, by being reduced to a pulp and beaten together; this is put upon a boiler, whilst in a wet state, and allowed to dry. It then becomes stiff and solid, and quite impervious to heat. This kind of felt is used for a lining to the copper bottoms of ships, for making roofs for houses and sheds, and covers for hay ricks and stacks of corn; and another kind is employed to encase the cylinders of steam-engines, for which it is well suited on account of its being a non-conductor of heat. The roofing felt is made waterproof by being soaked in a preparation of tar or bitumen. It is sold for 1*d.* the square foot, and is a very useful substitute for slates and tiles, but, on account of its inflammable nature, it would consume very readily if it were accidentally to catch fire. Sheds and rooms affected by the damp are frequently lined with coarse felting, which entirely excludes the air by filling up all crevices.

Felt is manufactured into very handsome *table cloths*. These generally have a ground of one colour, and a raised pattern of another; sometimes they are printed in different colours of elegant designs. Felt *carpets* are in very common use; they are sometimes of one colour, but are frequently printed in patterns of the same design as ordinary carpets, but the colours are apt to fade and become obliterated by constant wear long before the material is worn out. These carpets are warm and comfortable, and when the quality is good they are very durable, and are considered cheap. They are usually about 1½ yard wide. Felt cloth is used for lining coaches and pianofortes, and for a variety of other purposes. The Americans fabricate a thin kind of felted cloth, which they use to line coats and dresses. An attempt was once made in this country to manufacture

felt into broad cloth, without spinning or weaving, but it did not prove successful. The fabric, though having much the same appearance as that which was woven, was deficient in firmness and durability, and therefore not adapted for ordinary clothing.

It is said by some writers that felt was manufactured into soldiers' cloaks at a very early period, and used also for horse furniture. The Tartars had cloaks and tent-coverings, impervious to rain, made of it. The Turcomans, from time immemorial, have covered their tents with black or white felt, and it has been thought that the art of felting was brought to Europe by the Crusaders.

M. A. F.

KIND WORDS.

ray, a beam or line of light
loom (v.), *to appear large and*
indistinct at a distance
balm, *a fragrant healing ointment*
be-guile', *to cheat, to win from*
sorrow

wear'-y, tired
pil'-grim, *a wanderer, one who*
travels to visit holy places
blunt (v.), *to dull the edge or*
point
dis'-mal, *dull, sad, unhappy*

KIND words are like the morning sun that gilds the
 op'ning flower,
Kind words are like the blessings spread by ev'ry
 summer shower;
They light the heart with sunny beams, they spread
 a shining ray,
That cheers the weary pilgrim as he wanders on his
 way.

If you have nought to give the poor when winter's
 snow-clouds loom,
Oh! ne'er forget that one sweet smile may chase
 away their gloom:

Remember, too, that one kind word may blunt
affliction's dart,
And softly fall like healing balm upon the wounded
heart.

Let us have none but gentle words—no tales of
dismal strife,
But only kind things whisper as you tread this vale
of life;
Then try by every word and glance the suffering to
beguile,
And watch them when you speak kind words, how
happily they smile.

F. G. LEE.

THE GULF STREAM.

o-ce-an'-ic, *belonging to the ocean*
pros-per-i-ty, *success*
en-er-get'-ic, *possessed of energy*
or force of will
e'-ner-vates, *weakens*
phy'-si-cal, *natural, bodily*
in-tel-lect'-u-al, *belonging to the*
intellect or mind
ed'-i-fice, *a building*
re-veal'-ed, *made known*
cli'-mate, *state of the air, weather*

en'-ter-pris-ing, *venturesome, fond*
of undertaking great things
po-si'-tion, *situation, place*
pro-duc'-ing, *causing*
a'-gri-cul-ture, *culture of the*
earth
mo'-di-fy-ing, *altering, under-*
taking
tro'-pi-cal, *within the tropics*
dif-fus'-ed, *shed abroad*

DID you ever hear of ocean rivers, flowing, not
over the land as the rivers we see do, but through
the waters of the ocean? Perhaps you have *not*
heard of them; nevertheless, they exist, many of
them. They are usually spoken of, not as ocean
rivers, but ocean, or oceanic, currents. These
wonderful currents, or rivers, cross and recross the
ocean in many parts—rising, we scarcely know how,
flowing on for thousands of miles without losing

their course amid the rush of waters round them, and finally empty themselves into the ocean again.

We often hear and read that England and the other portions of the British Isles owe much of their prosperity to their position and natural advantages. And it is quite true. The people of the British Isles are extremely energetic and industrious. In India and other hot countries the people are obliged to waste a great part of their time. They cannot go out in the day to transact business or travel. The heat compels them to remain indoors, and often so enervates them, that they have neither energy of mind nor physical strength to undertake any great work.

In very cold countries, too, the physical and intellectual powers of the inhabitants are stunted and depressed by the excessive cold. We find, therefore, that *climate* greatly affects the character of the people, and that, in regions where either extreme heat or extreme cold prevails, the inhabitants lack the power of achieving any great work, whether physical or mental. Yet great works *are* done. Ships are built, palaces and splendid edifices of many kinds are erected, machinery and wonderful instruments of peace and war are invented, books are written, the wonders of the world are brought to light, the very secrets of the stars, and those earth hides in her bosom, are revealed. By whom? Chiefly by the inhabitants of those lands which enjoy a temperate climate.

Foremost among these are the British Isles and the countries of Western Europe; and, accordingly, in them we find the most energetic and enterprising people.

The climate of any country depends partly upon its position: that is, whether it has water all round it, whether hot or cold winds blow over it, whether it is near to, or distant from, the equator. If

surrounded by water a country is not so liable to extremes of temperature, the winds being tempered by passing over the water, so that they are neither intensely hot nor icy-cold. If a land lies near the equator it will be hot; if more distant the heat will be moderated. The British Isles are surrounded by water, the winds blowing over them are tempered, and they are at a suitable distance from the equator. We may, therefore, expect that these isles will have as temperate a climate as others in a similar position. They not only have *as* temperate a climate, but a far more temperate climate than other lands having similar advantages. There must, then, be some other cause at work to produce this result. Quite true; there is an agent at work producing it, and that agent is one of those great ocean rivers mentioned just now. It is called the Gulf Stream. Let us trace its course together, and learn, if possible, how it improves our climate, and helps to make us energetic, prosperous, and powerful.

Far away in the depths of the Antarctic Ocean this river is born. It sets out on its journey, passes round the western coast of South America into the Pacific. On it goes, till, just before reaching Australia, it divides into two parts. The northern part rushes round the north of Australia into the Indian Ocean; round Madagascar and the South African coast into the broad Atlantic. For a little while it journeys on round the south-western shores of Africa, and then rushes across the Atlantic to the coast of South America. On its journey through the warm waters of the Pacific and Indian Oceans it has grown warm too, and it rushes so fast through the Atlantic to America, that it has not time to cool itself. It dashes upon the coast of South America, and is sent back with equal violence. Part

of it now turns southward; the other travels north-west into the Gulf of Mexico. Here it endeavours to find an outlet into the Pacific; but no, the Mexican shores are strong, and it is hurled back and obliged to travel in an opposite direction. It is in the Mexican Gulf that it gets the name by which we know it, viz., the Gulf Stream. The water is still much warmer than that of the Atlantic, and being of a deep blue colour, can at once be distinguished from the surrounding water. Very fast it travels now, over a bed of cold ocean water that lies beneath it, within banks of the same strange material, receiving as it goes many tributary streams on either side. But even *these* do not deprive it of its warmth. After passing the Azores it again divides, one branch running southward, the other running north-west towards the British Isles. Arrived here, the stream again separates into two—one passing round Ireland, the western coast of England and Scotland, and round the north of that country, and, finally, crossing the German Ocean, and warming the shores of Norway; the other flowing round the southern coast of England to the western shores of Spain.

The warmth of the Gulf Stream is diffused through the atmosphere, the winds are warmed by it, and the lands round which it flows are thus rendered warmer and more fertile than they could otherwise be.

Were the waters of the Gulf Stream to become cold, or to find an outlet which would divert it from our shores, many fruits and animals which we now have would cease to flourish here; the excessive cold would chill our blood and paralyse our powers, agriculture and manufactures would suffer, our commerce with other lands would be injured, and probably ere long our national prosperity and influence would be a thing of the past.

Not only is the Gulf Stream thus useful in modifying climate, but by its means seeds, plants, and branches of trees growing in tropical regions are carried to temperate shores. This circumstance led Christopher Columbus to believe that there must be an undiscovered region to the west of Europe, since seeds and plants were conveyed from that direction by the current. Thus America was discovered.

Let us be thankful that so great a blessing has been sent of God for our country's good. At the same time, let us remember that when a land enjoys superior advantages, God expects its inhabitants to use and improve them to the uttermost. If, therefore, we, dwellers in fair and happy England, do not strive to excel in all good and noble works the dwellers in less favoured lands, God will account us less faithful servants than they, because those to whom much is given are expected to perform much.

S. C. C.

PARTS OF PLANTS USED AS FOOD.

ab'-so-lute-ly, *completely*
 de-sign'-ed, *fitted, intended*
 con'-sti-tut-ed, *formed*
 ma'-ni-ac, *one who has lost his*
 reason
 sub-sist', *to live*
 clas'-si-fied, *arranged in classes*
 se-lect'-ed, *chosen*
 nu-tri'-tious, *wholesome, nourish-*
 ing
 re-spi-ra'-tion, *the act of breathing*

stim'-u-late, *to urge on, to quicken*
 bev'-er-age, *a drink*
 in-val'-u-a-ble, *worth more than*
 can be told
 ac-cept'-a-ble, *pleasant, useful*
 at-tract'-ive-ness, *beauty, win-*
 ningness
 es-sen'-tial, *necessary*
 en-tail'-ing, *bringing on as a*
 result, causing

PLANTS furnish by far the greater portion of the food of man and animals. Without them animal life could not exist.

There are some animals designed by the Creator to feed on the flesh of other animals; therefore, plants do not form directly a portion of their food; but human beings, and many of the lower animals, are so constituted that a daily supply of vegetable food is absolutely necessary to their health. Deprived of this kind of nourishment the body pines, and becomes a prey to many loathsome diseases.

It is said, that if a human being were forced to subsist on a diet from which all vegetable substances were excluded, he would, in a short time, either die or become a maniac.

Plants are found in all the habitable portions of the globe. They vary almost endlessly in size and form, and are so numerous that though upwards of 100,000 species have already been classified, many more remain unknown. Generally speaking, it is not the entire plant, but in most instances some one particular part of it, which is used as food by man. Sometimes the *root* alone is selected, in other species the *leaves*, and in others the *stalk*, *buds*, or *seeds* are chosen. The *roots* of plants form

an exceedingly common and nutritious food. Some contain a large portion of sugar and starch; they serve to keep up the warmth of the body, and to supply the organs of respiration with material. Such are the turnip—a nutritious and easily-digested root, suitable for invalids, if properly prepared and cooked—the parsnip, carrot, and potato, which last, though not properly a root, may here be classed among them.

Others, taken in small quantities, serve to stimulate the digestive organs, or form agreeable salads. Such are the radish, horse-radish, beet-root, ginger-root, &c.

Others, as the onion, contain a wholesome vegetable oil, and possess highly nutritive properties.

The stalks of some plants likewise form an agreeable article of diet, as, for example, celery and the stalks of the rhubarb plant.

Even the woody bark of some species of plants is employed as food. Cinnamon, which is the dried bark of a tree, is largely eaten as a medicinal food by the slaves employed in the mines of South America.

Leaves of plants contain many wholesome juices, and are of great value in cooling the system, purifying the blood, and preventing many loathsome forms of disease. Among these we need only mention our common green vegetables and salads, many of which have highly medicinal properties. Their usefulness in the preparation of various beverages, though not strictly to be regarded as foods, may here be mentioned.

The flowers of some plants form an exceedingly palatable dish, such as the cauliflower and brocoli.

Of other plants, such as the asparagus, sea-kale, &c., the young shoots alone are eaten.

Fruits form one of the most acceptable forms of

vegetable diet, owing to their pleasant taste, variety, and great usefulness. Their rich juiciness makes them invaluable in feverish sicknesses, while their pleasant and wholesome flavour renders them eminently serviceable in the preparation of many tempting dishes.

But perhaps the most nutritious portions of plants are the *seeds*. These are of many kinds. Some, as in the Cerealia, or corn plants, are known as grain. These form by far the most important part of the daily nourishment of mankind, especially among the working classes. Wheat is said to contain more nutrition than flesh, and we know that wheaten bread will sustain life longer than any other single kind of solid food.

Leguminous seeds, again, contain a very large proportion of nutriment. Such are peas, and the various kinds of beans.

Much more might be added on this subject; but sufficient has been said to show how useful, how absolutely necessary, plants are, not only to the beauty and attractiveness of the earth, but to the health and life of man and of the lower animals likewise. Therefore, if we desire to preserve our bodies in a state of health, we should endeavour to obtain a due admixture of this kind, with animal food. Both are essential, and neither may, therefore, be neglected without entailing serious evils upon the frame, and rendering man less useful and happy than he would otherwise be.

S. C. C.

THE BLACKSMITH'S SON.

stal'-wart, *well-made*
 vig'-our, *strength*
 tone, *the sound of the voice*
 jo'-vi-al, *gay, merry, cheerful*

brawn'-y, *muscular, fleshy, hard*
 prof'-fer, *an offer, that which is*
 offered

A STALWART lad is the blacksmith's son,
 With broad, bare chest, and strong ;
 His laugh is loud, his voice is deep,
 And jovial, too, his song ;
 There's vigour in his well-knit frame,
 Might in his brawny arm ;
 But small his share of winning ways
 A maiden's heart to charm.
 Yet, like a child, sweet Cicely
 Is his heart's chosen one ;
 The village pride is lov'd and woo'd
 By Mark, the blacksmith's son.

The baron's heir is young and gay,
 The proudest in the land,
 Of noble birth, a princely home,
 And wealth at his command :
 On horse or foot, his pathway lies
 Towards her quiet home ;
 But Cicely smileth not, nor sighs,
 Whether he go or come ;
 Bright beams his eye, soft tales he tells,
 And honied is his tone :
 He seeks to win away her heart
 From Mark, the blacksmith's son.

The baron's heir, with gold and gems,
 Is skill'd in arts to woo ;
 The blacksmith's son can only boast
 A stout heart, fond, and true.

So Cicely her choice has made :
 She deems his proffer small,
 Who could but share with her his wealth,
 While Mark gives heart and all.
 The lot she takes, the lowly one,
 Until her life is spun,
 To be the humble, loving wife,
 Of Mark, the blacksmith's son.

MRS. V. ROBERTS.

THE NATURE OF MONEY.

<i>mis'-chiev-ous, doing injury</i> <i>pur'-chas-ed, bought</i> <i>bar'-ter, to change goods for goods</i> <i>in-tro-duc'-ed, brought in</i> <i>bus'-i-ness, what one has to do,</i> <i>employment</i> <i>sus-tain'-ed, kept alive</i>	<i>suf'-fice', to be sufficient</i> <i>im-me'-di-ate, done at once</i> <i>per'-man-ent, lasting</i> <i>cal-am'-i-ty, a misfortune</i> <i>im-pede, to hinder</i> <i>an-nu'-i-ty, a pension, a private in-</i> <i>come which terminates at death</i>
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It would appear at first sight as if no one could fail to understand the real nature of money. Yet not a few wrong notions have been held about it, some of which have produced very mischievous effects.

It is sometimes thought, or appears to be so, that money is valuable in itself, apart from the things that can be purchased with it. Yet, to Robinson Crusoe treasures of silver and gold were of less value than one grain of corn : and no one really strives for money for its own sake. A man labours that he may get for himself and family food, clothes, a house, books, and other pleasant or necessary things. If with equal completeness and equal convenience he could get these things without money, he would not need it or care for it.

In the early rude ages no money was used. Men

bartered what they wished to exchange, but a moment's thought will show what unspeakable confusion would be introduced by such a system in a busy land like ours.

Yet the whole of men's business with each other is based on this same exchange or barter. The labourer barter his labour, the author his talents, the soldier his bravery, for the different things that help to make life endurable and pleasant.

Everyone in the land, each in his proper calling, is, or should be, producing some useful thing to add to the great common stock from which all are to be nourished and sustained. Each receives from that common stock the share which he is entitled to, and his money or wages are but the tokens which show how great or how small is his proper share. We may imagine this sharing of the results of our united labour to be going on more or less justly every day; and we may notice here one of the many advantages of money. A man may prefer not to receive and consume his proper share at present, but wish rather to save it for his children or other purposes. If so, he simply saves instead of spending his wages, and so his object is secured.

It will not be difficult to show how money may change in value. Since the money or wealth a man possesses denotes the share of the common stock of valuables which he is entitled to receive, it might be thought that there is just enough money to purchase this whole stock. There is not, however, nearly so much money in a country, because only a portion of these valuable things can be offered for sale and purchased at any one time. The money of a country just suffices to buy that portion. If, now, there should be a great increase in the common stock of valuable things from any cause, such as good crops, it is plain that a greater amount will be

bought for the same money, or, as we say, prices fall.

If it were possible that to-morrow the whole amount of money in the world were reduced to one-half, the immediate result would of course be great confusion in all bargaining. This, however, would be the permanent result:—that which costs 10*l.* now would cost then 5*l.* only, and the world be neither the richer or poorer when the ill effects of the surprise were past. Were the stock of wheat reduced to one-half, it would be a real calamity; for wheat is a real article of wealth, while money is not. Again, if the amount of money in the world were suddenly doubled, the effect would be that what now costs 1*l.* would then cost 2*l.*; a man earning 6*s.* a day would then earn 12*s.*, but would pay double for all the things he purchased. Now changes of this latter kind have really happened in the history of the world. When America was discovered, so great was the supply of gold brought into Europe, that prices of things changed wonderfully; and it is said that 1*s.* before the discovery would buy as much as 1*l.* will at the present time. Now these alterations in the value of money are undesirable; they confuse and impede trade, and in many ways are injurious. If a person lends 1,000*l.*, and is repaid when money has become reduced in value, we see that he is unjustly punished. Those who are receiving Government annuities or fixed salaries also suffer when any alteration in the value of money takes place. We see, then, that the discovery of a gold mine is not really a gain to the world—not directly, at least. Nay, it is a loss rather. A man goes to the gold diggings and gains 20,000*l.*—is the world the richer? Has the man added anything to the general stock of things really useful and valuable? He has not; but has become entitled to

20,000*l.* worth of them without having produced any portion. The world is then the poorer by that amount; for he or his descendants will receive and consume that amount of things which others have produced.

Such discoveries of gold mines are not unmixed evils, however; in several respects they are rather benefits to the world. It is desirable to maintain the value of money unaltered; but money itself gets worn away, though very slowly; is lost in shipwreck, or even buried in the earth. Fresh stores are constantly needed to balance these losses. Great extensions of trade make a greater quantity of money necessary. Our great and increasing trade with China and India has absorbed a very great deal of the Australian and Californian gold, and has prevented a change in prices which would otherwise have happened; and the discoveries of gold mines have attracted settlers to Australia and California, and have thus widened the area on which the energies of mankind may be exerted.

R. McW.

VOLCANOES.

de'i-ties, *gods and goddesses*
 tran'-quil, *quiet, at rest*
 sum'-mit, *the top*
 e-rup'-tion, *an outbreak*
 in'-ter-val, *a space of time or distance*
 phe-nom'-en-a, *wonderful occurrences in nature*

dorm'-ant, *sleeping, at rest*
 sub-stan'-tial, *strong, firm*
 e-rec'-tion, *a building*
 cra'-ter, *the cup or hollow at the top of a volcano*
 tor'-rent, *a rushing stream*
 va'-pour, *steam*

In the old heathen days of Greece and Rome, when various male and female deities were supposed to preside over the world's affairs, Vulcanus was the

imaginary god of fire. In his honour the ancient Romans gave his name to an island in the Mediterranean which was remarkable for its discharges of fire and smoke. Our word volcano is derived from the same source, and is the common name applied to all mountains which shoot forth substances apparently by the action of fire, whether the fire be seen or not.

Volcanoes, or burning mountains, as they are often called, are distinguished even in a tranquil state by the regularity of their shape, which gradually diminishes from the base to the summit like a cone, and by their having at the top a deep, basin-shaped hollow, called the crater, from the interior of which the fiery fountain of lava mainly springs.

Volcanoes differ very much both in size and activity, some smaller ones giving forth a continual blaze, like Stromboli, 'the great lighthouse of the Mediterranean,' while in others eruptions occur but very seldom, sometimes at intervals of even hundreds of years. Generally speaking, the longer a volcano has remained dormant, the more tremendous is the explosion that at last takes place.

Of all the phenomena connected with the earth, the action of volcanoes is the most frightful in its grandeur, the most terrible in its effects. In most cases, before the outburst of the eruption, frequent shocks of earthquake occur, as if in solemn warning of what is about to follow. The air is hushed to an unusual stillness, the sea heaves violently to and fro, low rumbling noises, as if of distant thunder, are heard, and the trembling earth rocks backwards and forwards, destroying in a few moments the most substantial erections of man.

Thick black columns of smoke presently begin to pour from the summit of the volcano, violent explosions are heard from within, and the sides of the

mountain itself are shaken and rent. Quick flashes of fire, clouds of ashes, and showers of burning stones fly from the crater like sparks of fireworks, frequently accompanied by torrents of water, which make a hissing noise as they dash on the heated rocks around. At length, streams of molten lava commence to flow from the top down the sides of the mountain to the foot. Sometimes the fiery torrent spreads no further; at others, it rolls on and on over the level country, changing miles of cultivated fields into vast sheets of flame.

The red-hot lava soon cools—at least, near the surface—forming a firm, solid, black sort of rock, similar in appearance to the asphalt laid down as pavement in our streets. From the lava of some volcanoes pumice-stone and sulphur, so much used in manufactures, are obtained in large quantities.

Eruptions have sometimes been so violent as to bury whole cities beneath their mighty rolling river of ashes, lava, and fire. Nearly a century before the birth of our Lord, Herculaneum and Pompeii, two cities built, as it proved, dangerously near Mount Vesuvius, in Italy, were entirely overwhelmed by its eruption. So completely were they buried, and the face of the country altered by the over-flowing volume of lava and ashes, that the very sites where they had stood became forgotten. That of Pompeii was only discovered accidentally hundreds of years afterwards by a peasant employed in sinking a well near the foot of the mountain. Since then—indeed, even quite recently—the greater part of the ashes and lava covering the unfortunate cities has been dug away, and the remains of the inhabitants discovered. These have been so well preserved by the firm, solid mass of lava in which they were encased, that the forms and positions of the poor creatures, just as they were variously engaged at

work, or in vainly attempting to escape from the sweeping torrent of fire, were easily distinguished. Painfully sad and interesting must have been the scenes disclosed when the quiet cities of the dead were again brought to light after having lain buried and forgotten for nearly two thousand years. Poor creatures! they could not have been aware that Vesuvius was a volcano, or surely they would never have built their homes on such dangerous ground.

Dreadful as these volcanic eruptions are, they are yet the means of saving the earth from the still more dreadful and destructive effects of earthquakes. It is supposed that for some good reason, known only to Him who so arranged it, the interior of our earth is a region of heated vapours, and, perhaps, also of actual fire. These vapours, by expanding and causing explosions far down in the depths of the earth, are supposed to be the cause of the earthquakes which occur upon the surface. Earthquakes are of frequent occurrence before the outburst of a volcano, and generally cease as soon as the eruption commences; hence, volcanoes, terrific as they are, may be regarded as merciful arrangements of Providence, for they are the funnels by which the destructive elements escape into the outer air.

By far the greater number of volcanoes are situated upon islands, some of them so small that the mountain seems to rise directly from the sea, and in such cases an eruption is comparatively harmless. But whether standing out like enormous chimneys from the sea, or placed upon the great continents of the earth; whether in repose or the greatest and most awful activity, they are under the controlling power of Him who 'toucheth the mountains and they smoke.'

M. M. W.

CARBON.

dis-sim'-il-ar, *unlike*
 i-den'-ti-cal, *the same*
 de'-mon-strate, *to show, to prove*
 con'-sti-tute, *to form, to compose*
 com-bine', *to unite*
 in-cau'-tious-ly, *without caution*
 ab-sorb', *to suck up*
 in-ge-nu'-i-ty, *skill*

trans-form-a'-tion, *change*
 tran-scend'-ent, *not to be equalled*
 vol'-a-tile, *easily driven off in vapour*
 im-prac'-ti-ca-ble, *that which cannot be done*
 su-per'-flu-ous, *that is not wanted*

CARBON is one of the most important of the substances which chemists call elements or simple bodies.

It is found in a pure state in two forms, distinct and entirely dissimilar in outward appearance and in physical properties, but nevertheless chemically identical.

These forms are diamond and graphite. Diamond is the hardest known substance, and easily scratches glass, while graphite is so soft that it crumbles when pressed upon paper. Diamond is transparent and colourless; graphite is opaque, and resembles lead in hue, from which fact it has been erroneously called black-lead, or plumbago. Diamond is about three and a half times as heavy as water, graphite about two and a quarter times. Notwithstanding these differences, the science of chemistry demonstrates to us, in a simple manner, that both substances are pure carbon. Equal weights of diamond and graphite being taken, and burnt in oxygen gas, or in the atmosphere which contains oxygen, the results are equal quantities of carbonic acid. Carbonic acid is a compound of carbon and oxygen. A diamond an ounce in weight, combined with oxygen in the manner mentioned, gives a certain quantity of carbonic acid: an ounce of graphite similarly treated gives the same quantity of carbonic

acid. Therefore, it is clear that the diamond and the graphite are each an ounce of pure carbon.

A process is known by which a diamond is made to resemble a piece of graphite; but all the ingenuity of man has failed to produce the opposite transformation. We are altogether unacquainted with the way in which diamond has been formed. It has long been the dream of the chemist to convert into diamond some other form of carbon, but Nature still preserves the secret.

Diamonds are found in India, Borneo, Brazil, and South Africa. Their great value arises from their transcendent beauty and their rarity.

Graphite is found in Cumberland, and in large quantities in Siberia and Ceylon. Borrodale, in Cumberland, produces the purest variety, and from it the best pencils are made. Impure varieties are often found from which pure graphite is obtained as a powder, which is afterwards strongly compressed into a solid mass; but the pencils made from it are of an inferior quality.

Carbon also constitutes a large part of all animal and vegetable structures, and is obtained from them in the form of charcoal, which, though differing from both diamond and graphite, is still carbon. Wood being heated in a closed, or partially closed, vessel, has its volatile or gaseous parts expelled, and wood-charcoal is left.

Bones, or other animal substances, similarly treated, give animal-charcoal.

Coal, which is of vegetable origin, in like manner gives coke, another kind of charcoal.

The purest form of charcoal is lampblack—the black substance which is deposited when anything is held over the flame of a lamp. Lampblack is made in large quantities, and used in the manufacture of printing-ink, blacking, &c.

Wood-charcoal is the fuel used in many countries. It is the business of the charcoal-burner to prepare it from timber. If charcoal be burnt in a closed room it soon combines with the oxygen of the air and forms carbonic acid, to breathe which is fatal to animal life. Many persons have lost their lives by incautiously burning charcoal in rooms badly ventilated. During their sleep the oxygen has become exhausted, and they have been suffocated by breathing carbonic acid. A wood-charcoal fire, like a coke fire, burns with a steady bright-red glow, without the smoke and blaze of ordinary wood when burning. Charcoal is used not only in preference to wood, but also in some instances where the use of wood would be impracticable. Animal charcoal, bone black, iron black, &c., are names given to the carbon obtained chiefly by burning bones in the way that has been mentioned. This charcoal is a very valuable substance, owing to the extraordinary power it possesses of removing from liquids colouring matter of an organic, that is, of an animal or vegetable character.

The sugar-refiner, for instance, changes brown sugar into white by the aid of animal charcoal, which he is able to use many times over. The charcoal absorbs the colouring matter of raw sugar, but this colouring matter can be removed from the charcoal, which can be used again and again in the same way. It is, however, less valuable after each process.

Charcoal is used in many other ways in the arts and manufactures as a purifier, animal charcoal being the best.

Water containing impurities of an animal or vegetable kind is purified by trickling through a bed of charcoal.

A vessel for purifying water in this way is called

a filter. Water so impure as to be quite unfit for drinking becomes pure when passed through the filter.

Powdered wood-charcoal makes an excellent tooth powder, and some persons even use soot from the chimney in the same way: soot being one form of charcoal. In fact, we may regard carbon as an excellent purifier.

Besides forming so large a part of all animal and vegetable substances, carbon combines extensively with mineral substances. A few familiar instances may be mentioned. What boy or girl does not know carbonate of soda? That is a compound of carbon, the gas oxygen, and a metal called sodium. Again, the well-known medicine carbonate of magnesia is a compound of carbon, oxygen, and the metal magnesium. White marble, chalk, &c., are chiefly carbonate of lime, which is a compound of carbon, oxygen, and the metal calcium.

In conclusion, you will remember that we said carbon formed part of all animal bodies; well, when we draw in our breath the oxygen of the air we draw in combines with some superfluous carbon in our bodies, and forms carbonic acid, which is what we breathe out, and is exactly what plants require. They have innumerable little mouths by which they take it in.

J. P.

A BIRTHDAY BALLAD.

trow, *to think, to believe*
 pro-phet', *one who foretells future*
events

be-guile', *to deceive, to amuse*
 min'-strel, *a singer, a musician*

THOU art plucking spring roses, Genie,
 And a little rose art thou,
 Thou hast unfolded to-day, Genie,
 Another bright leaf, I trow ;
 But the roses will live and die, Genie,
 Many and many a time,
 Ere thou hast unfolded quite, Genie—
 Grown into maiden prime.

Thou art looking now at the birds, Genie,
 But, oh ! do not wish their wing !
 That would only tempt the fowler, Genie,
 Stay thou on earth and sing ;
 Stay in the nursing nest, Genie,
 Be not soon thence beguiled,
 Thou wilt ne'er find a second, Genie,
 Never be twice a child.

Thou art building towers of pebbles, Genie,
 Pile them up brave and high,
 And leave them to follow a bee, Genie,
 As he wandereth singing by ;
 But if thy towers fall down, Genie,
 And if the brown bee is lost,
 Never weep, for thou must learn, Genie,
 How soon life's schemes are crost.

Thy hand is in a bright boy's, Genie,
 And he calls thee his sweet wee wife,
 But let not thy little heart think, Genie,
 Childhood the prophet of life ;

It may be life's minstrel, Genie,
 And sing sweet songs and clear,
 But minstrel and prophet now, Genie,
 Are not united here.

What will thy future fate be, Genie,
 Alas ! shall I live to see ?
 For thou art scarcely a sapling, Genie,
 And I am a moss-grown tree !
 I am shedding life's leaves fast, Genie,
 Thou art in blossom sweet ;
 But think of the grave betimes, Genie,
 Where young and old oft meet.

MISS JEWSBURY.

THE RUSSIAN PEASANTRY.

e-man-ci-pa'-tion, <i>the act of setting free</i>	con-viv'-i-al, <i>merry</i>
pro-pri'-e-tor, <i>an owner</i>	vi-cis'-si-tudes, <i>changes</i>
de-plor'-a-bly, <i>sadly</i>	as-cer-tain', <i>to learn, to make sure</i>
as-so'-ci-ates, <i>companions</i>	trous-seau' (Fr.), <i>a bride's outfit</i>
con-sid-er-a'-tion, <i>thought</i>	per'-man-ent, <i>lasting</i>
ap-pre'-ci-ate, <i>to value a thing at its proper worth</i>	fer-men-ta'-tion, <i>a process which liquors undergo before they become intoxicating</i>
ser-vile, <i>slavish</i>	
im'-ple-ment, <i>a tool</i>	

Look at the map of Europe. East of it, Russia comprises more than one-half of the whole continent. In this country, thirty millions of serfs, or slaves, have lately been made free by the Czar. Previously to their emancipation their very existence depended on their proprietors. They were bought and sold like chattels, and flogged at the will of their owners. Before the emancipation the population was divided into two classes—nobles and serfs. Since then it has been divided into five classes: 1. The high

aristocracy; 2. Landowners; 3. Merchants, who have adopted French and other customs; 4. Native merchants; 5. The peasantry. Only a few years have elapsed since these last were made free, and the result has been an unexampled progress in prosperity. New houses have been built in the villages; the fields are better fenced; the yards attached to the houses much enlarged; the horses kept well shod; candles have taken the place of pine-wood lights; and the men and women are better dressed. There is also a cry for education; for, at present, this unfortunate class is deplorably ignorant. The few who can read and write are ashamed to own it, lest they should excite envy among their associates. They have since their emancipation cultivated a better knowledge of what takes place in neighbouring towns; and many of them are entering into small businesses, such as tanners, millers, &c. They also treat their women with greater consideration, and are beginning to have more self-respect for themselves; they appreciate their release from bondage, and rejoice in their unexpected freedom. They are still painfully timid, and even 'sheepish,' when brought into contact with their superiors, not having yet entirely thrown off the servile habits engendered by their long subjugation to their task-masters. They are said to be naturally polite, and never pass an acquaintance without lifting their hat with the most gentlemanly grace.

The chief food of the peasant is black bread and cabbage soup, and they drink a decoction called 'quass.' This last is made from a fermentation of black bread and water. Their wants being few, two or three days' labour is sufficient to procure what they need for the rest of the week, which time they spend in idleness. Their clothes are all home-made.

Each Russian peasant has a house of his own, and

adjoining it a piece of land of about ten acres. On this he keeps a cow, and generally one or two sheep, and a horse—quite a little farm, in fact, if only properly managed.

The Russians are, as a rule, good workmen. They have the faculty of imitating almost any model that is put before them, and especially excel in carpentering. A peasant can perform wonders with an axe only; he has, indeed, been known to build his house without the use of any other implement. The worst vice of the men is a love of strong drink. On holidays, or when they have more money than usual, they will swallow as much 'vodky' (a kind of whisky) as they can, and as quickly as they can. Nor are they at all convivial on these occasions, but will doggedly and in silence imbibe glass after glass of raw spirit, without even a pause, until they are quite drunk. They will then remain in the 'traktir' (or public-house) till turned out by the proprietor, to sleep off the effects of their carouse in the cold streets until some friends or policemen remove them. They are never quarrelsome, either when drunk or sober. They appear, however, to have an extreme distaste for anything like truth, and seem to take the greatest pleasure in inventing the most plausible falsehoods. This probably has arisen from their long subjugation to the tyranny of their old rulers, under whose cruelties they naturally lost all self-respect. They are, too, frequently guilty of dishonesty, and are very clever in escaping punishment when discovered.

In the villages the peasants' houses are made entirely of wood. The interior of these houses is arranged to meet the vicissitudes of climate. That part which is inhabited in summer is vacated on the approach of winter for that portion which has been, during the hot weather, used as a kitchen. Here

they all cluster round the stove, and even their sleeping places are near it. For the little children, berths are suspended over the stove, at a distance of about eighteen inches from the ceiling, and here the tiny ones roost at night, whilst the elders of the family make their beds on the top of the stove itself. The only furniture to be seen in these wretched dwellings is a table, and a large wooden bench fixed round the wall of the apartment; a few pictures of saints hanging in the corners, and, invariably, a large showy trunk, painted in many colours, and bound round with iron hoops. This trunk contains all the treasures of the family—the dresses only worn on the occasion of some festival, and handed down from family to family; a few towels trimmed with lace, by which they set great store, and with regard to which a peculiar custom is observed at their weddings. When the bride and bridegroom call upon the 'barrin' (master or employer) to pay their respects, the bride hands him one of these towels on a plate, which he accepts, and in return presents her with a pocket-handkerchief, in the folds of which are some roubles. [The value of a Russian rouble is 3s. 3d.] Besides these things, the trunk may contain a loaf or two of cake-bread, a few groceries, and other trifling articles. A small corner near the stove is portioned off for cooking purposes, and provided with suitable utensils. Small and large insects increase and multiply in the dirt of these wooden huts. The people are very superstitious about a kind of cockroach, called a 'tarakan,' which they believe brings good luck with it. The peasant children run about wild, and are free from correction or training, but are always well treated by their parents. In fact, no people can be fonder of their children than are the Russian peasants. The children are nearly always strong and healthy, since

the weakly ones die off soon after their birth. To every house is attached a bath, and on Saturday the whole family undergoes a thorough washing. This suffices them for a week. The Russians are always astonished at the immoderate consumption of water by the Britons; and a Russian servant will be a long time before he understands you require more for your morning ablutions than a pint of water, such as he has been accustomed to serve for the use of his native master.

But to return to the peasants. On the other days of the week, they merely wash their hands before eating. They all sleep in a portion of the clothes they wear by day, and which they never take off but for their Saturday bath. In all their doings they are great slaves of routine. Thus, on a certain day, called 'Apple-day,' the priest pronounces a blessing on the ripening fruit: then, and then only, will the people begin to eat it; if they do so before, they believe they will get cholera. But when the day for oranges comes they will eat no more apples.

They have some peculiar customs for welcoming Easter, which are not, sometimes, altogether agreeable to a stranger. For a week beforehand they are busy boiling and painting eggs. Nobody then considers himself insulted by a kiss and the presentation of an egg. The peasants have a great reverence for their religion (that of the Greek Church). Their churches are beautifully decorated within with gold and silver. According to the tenets of their religion no carved images are allowed in them. They are usually lighted with numerous candles. Every village has its church. The priests are always warmly welcomed by the peasantry, especially at a funeral or a wedding feast. Every funeral ends with a dinner, and the more convivial they are the more honour to the dead.

When a peasant wishes to marry he first looks out for a strong, hearty girl, the one who would be the most likely to make him a good beast of burden. This is not difficult to achieve, for as has been before noticed, the weak ones seldom live to grow up. When he has found one to his taste, the next important proceeding is to ascertain what the damsel will give him for the privilege of becoming his wife. He fixes a sum that will satisfy him, and then lets her parents know that if they will pay him so much, he will marry their daughter. Among the lowest class of peasants the terms are generally twenty roubles, a new suit of clothes, a certain number of shirts, and a pair of boots. The bride must also provide her own *trousseau*, every article of which is settled by the contracting parties before the wedding takes place. When all is settled the marriage is proceeded with, still at the cost of the bride and her relations, who invite the bridegroom and his friends to meet, at a succession of family feasts, the bride's own female friends. At these entertainments the principal amusements are dancing, and playing a game closely resembling that which in England is called 'Kiss in the ring.' At the wedding a large showy trunk is provided, in which are placed the bride's *trousseau* and the garments provided by her for the bridegroom. This is carried about by them throughout the day's proceedings; first to the church, and afterwards to the *traktir*, to which they adjourn directly upon the termination of the religious ceremony, and at which they consume a great part of the bride's dowry. They then sally out, more or less intoxicated, dressed in the most grotesque of costumes, and with 'cat's music' of castanets and saucepans, parade the streets.

These diversions are kept up for two or three days, till the dowry is spent, and then the big box finds

a resting-place in its permanent home, and the bride settles down to serious work.

The love of a Russian peasant for his Czar is something indescribable. The Czar is to him an incarnation of Providence on earth—an almost omniscient and perfect being, created for the especial protection of the peasantry, responsible for nothing that goes wrong, but the source of every alleviation that smooths the life of the peasant. They have an almost childish love for him, and with it is mixed no little superstition, so that his name and their saints are often mingled together in their prayers. Every peasant believes he or she is known personally to the Czar, and that simply to knock at the door of his palace is to gain immediate admittance into his presence. These poor people may well carry their love of the Czar to excess, and believe the man who has done so much for them in the way of emancipating them from slavery is something higher and holier than a mere human being. These thirty millions of slaves have been told that it was their great Czar who caused their chains to be broken.

The peasants have many holidays, but few amusements. Sometimes, but not often, the boys may play a game not unlike our game of 'hockey.' On a holiday the girls meet in groups and sing their mournful national songs.

J. K.

GLACIERS AND ICEBERGS.

mag-nif'-i-cence, *grandeur*
 ac-cu'-mu-lat-ed, *heaped up*
 av'-a-lanche, *a falling mass of*
 snow
 al-ter'-nate, *happening by turns*
 o-ri'-gin-al-ly, *at first*
 mon-o'-ton-ous, *without variety*
 way'-far-er, *a traveller on foot*
 fan-tas'-tic, *curious, fanciful*
 ar-rest', *to stop*

ad-orn'-ed, *ornamented*
 al'-a-bas-ter, *a kind of white*
 marble
 cat'-a-ract, *a waterfall*
 es-cort', *to accompany as a guide,*
 or protector
 cre-vasse', *a wide crack in a*
 glacier
 dis-solve', *to melt*
 per-pen-dic'-u-lar, *upright*

AMONG Alpine heights, and in many other mountain ranges, whole summits are clothed in everlasting snow, the valleys and clefts, and sometimes the sloping sides, are fields of perpetual ice. These masses of ice—the offspring of snow-capped mountains—are called glaciers, and are to be found in large numbers and great magnificence among the Alps, the Pyrenees, and the mountains of Norway and Sweden.

Glaciers are formed by the melting and freezing again of the mountain snow. During the winter snow-storm after snow-storm descends in thick flakes upon the heights, until the accumulated mass is overbalanced by its own weight, and either falls in avalanches into the valley below, or gently slides downwards until it finds a resting-place on the mountain slopes. Though but little warmth is brought to these regions by the summer's sun, there is sufficient, just in the brightness of the day, to thaw the surface of this fallen snow, and during the night it is again frozen into a glassy, glittering case of ice. Day after day, year after year, this alternate thawing and freezing go on, until what was originally snow is changed into great fields of ice. These may be counted by hundreds among the

Alpine mountains—some as much as fifteen or even eighteen miles long, and varying in thickness from eighty to several hundred feet.

Far from being monotonous in appearance, these ice-lakes present every variety of sublime and beautiful scenery. In some the surface is broken into waves, as if a mighty torrent had been suddenly arrested in its headlong course, and bound in icy fetters. In others the ice takes the form of great blocks or cliffs, divided by chasms of fearful depth ; while some again are adorned with glittering peaks and pyramids, looking like the spires and towers of a city of alabaster.

Herds of chamois have their home among the mountain peaks, where they leap lightly and fearlessly from crag to crag. In all cases a clear stream of water of icy coldness flows from underneath the glacier, which forms cataracts of great beauty as it falls over the rocky precipices in its downward course,—carries fertility to the mountain pastures below, and provides the necessary supply of water to feed the great rivers of the land.

The waste caused by the melting of the lower ice and flowing of this mountain stream is made up for by the fresh snows falling upon the surface ; indeed, sometimes more than made up, so that the glaciers become of increased size.

Large numbers of tourists, attracted by the grandeur of Alpine scenery, resort every summer to Switzerland, and escorted by native guides, make toilsome and dangerous journeys up the mountain sides. Such daring ascents are frequently attended with serious accidents and sad loss of life. Perhaps, in passing along one of the narrow shelving snow-covered paths, the treacherous ice beneath gives way under the traveller's foot, and he is thrown down the rugged slope. Or it may be that in

crossing one of the natural ice-bridges, which in many places span the crevasses in the glaciers, he becomes dizzy, loses his balance, and falls into the chasm below.

Sometimes travellers lose their way in the great snowy mountain wastes, and, worn out with fatigue and benumbed with cold, fall into a sleep from which, alas! they never wake.

Numbers are rescued from this sad fate by the monks and famous dogs inhabiting the lonely convent of St. Bernard, among the Alpine glaciers and snows. Many an exhausted wayfarer has owed his life to the great instinct and sagacity of these dogs, which, after a little training by their masters, are able to seek out the poor lost travellers even though buried under the snow, and to afford them the nourishment they require from the baskets of provisions fastened by the monks round their necks.

In the dreary wintry regions of the north and south poles, where ice and snow reign from year to year, masses of ice, similar to mountain glaciers, are formed at the level of the sea. From these, enormous blocks break off and slide into the water, where they float like majestic island mountains over the blue waves, until, as they reach the warmer regions of the ocean, they gradually dissolve.

Seen under the flashing, many-coloured light of the Aurora Borealis or the summer's sunshine, these icebergs are magnificent in the extreme. Many are more than a quarter of a mile in length, and tower to the height of over two hundred feet. Some have perpendicular sides and level tops, resembling gigantic blocks of alabaster, chiselled by workmen's hands. Others present every variety of fantastic form; so that one might imagine they were the ruins of cities whose buildings had been massive alabaster palaces, churches, and towers. In some, wide arches

and deep caverns, formed by the action of the sea, are the haunts of flocks of sea birds which fly screaming to and fro, peopling the icy solitudes with wild, unearthly life.

Polar bears, during their winter sleep, are frequently drifted upon icebergs far away from their native home, to the shores of Iceland, where, hungry, after their cold, strange voyage, they commit great ravages among the flocks, until caught by the Icelanders, who quickly convert their skins into the warmest of warm great-coats.

Of all dangers which beset sailors engaged in the whale and seal fisheries, or in exploring the almost unknown regions of the far north and south, icebergs are by far the greatest, especially in a storm. Imagine a vessel in the darkness of night dashing blindly onwards, while huge icebergs float around on every hand. No lighthouse throws its friendly glimmer upon the scene, and the position of the great ice-rocks can only be guessed at by their peculiar crackling, rustling sound as they grate one against another, and give short warning of the awful impending danger. Under such circumstances vessels are sometimes struck by the mighty icebergs, and, with their crews, sink to rise no more. Others escape to tell the tale of their wonderful and merciful preservation; and surely they must feel that nothing can have shielded them from destruction, and guided them safely through their peril, but the hand of an Almighty Providence.

M. M. W.

COAL.

ITS USES AND PRODUCTS.

murk'-y, *dark, cloudy*
 in-va'-ri-a-bly, *always*
 ge-ol'-o-gist, *one who studies the*
 structure of the earth
 mar'-i-time, *relating to the sea*
 vol'-a-tile, *easily driven off in*
 vapour
 res'-in-ous, *containing resin*
 un-con-sum'-ed, *not burnt*
 fa-cil'-i-ty, *easiness to be done*
 sup'-ple-ment-ed, *added to*

ul'-ti-mate-ly, *at last*
 sub'-se-quent, *following*
 lo'-co-mo-tive, *a travelling steam-*
 engine
 ig-ni'-tion, *lighting*
 bit-u'-min-ous, *containing pitch*
 or tar
 fa-mil'-i-ar, *well known*
 pre'-val-ent, *common*
 cor-rod'-ed, *eaten away by rust*

IN the reign of Edward I. a proclamation was put forth which forbade the use of coal, declaring it to be a public nuisance.

Very recently had Edward's subjects begun to use it, and probably to a limited extent only, but sufficiently so to have become disgusted with the black smoke which it gave forth, and which, owing to the imperfect construction of their fire-places, would bear them unpleasant company for a long time.

Could one of our thirteenth-century ancestors revisit the haunts of his lifetime, he might still regard coal-burning as a nuisance, for we have undoubtedly much to learn before we can improve the murky atmosphere of our towns; but what a marvellously important part he would find coal playing in modern civilisation, especially in the British Isles!

As fuel for domestic purposes, coal is almost universally used by the population of these islands. It is, no doubt, often supplemented by wood, peat, and other materials, but there are few places where it is not used in some degree.

In the smelting of ores, that is in separating the pure metals from the earthy matters with which they are almost invariably mixed when they are dug up, coal is very much used. Iron, for instance, which may be called the twin brother of coal, as the two are generally found together, both belonging to what geologists call the carboniferous system, is obtained in the form of ironstone, a compound chiefly of iron and clay. Into the blast furnace, a huge structure from fifty to eighty feet high, alternate layers of coal, ironstone, and lime, are constantly thrown from the top, and gradually sink down until ultimately they run out at the bottom in a molten state, partly as cast-iron, and partly as slag, or refuse, which consists of the lime mixed with the impurities which the burning coal has loosened from the iron. The combustion of the coal is all the time kept up by a blast of hot air which is forced in at the bottom of the furnace. Through all the subsequent stages of the manufacture of iron we likewise find coal used. It is the fuel used in the manufacture of machinery, and also in the production of steam to drive that machinery.

By the aid of coal as fuel the steam is created which sends the locomotives dashing along our railroads, and our steamships ploughing the sea in every direction, regardless of winds and currents.

As an instance of the maritime use of coals, we may mention Her Majesty's turret steamship 'Devastation,' launched in July 1871, which will be enabled to take on board, according to official calculations, 1,800 tons of coal, sufficient for a run of six or seven thousand miles.

But it is not only as fuel that coal is serviceable to man. It is also the raw material from which numerous important substances are manufactured.

The chief of these is coal-gas, or, as we familiarly call it, 'gas.'

The blaze which coal gives forth for a considerable time after ignition, is caused by the burning of a gaseous compound similar to, though more impure than, the 'gas' with which our houses, our streets, our manufactories, and our public buildings are illuminated. By a process known as distillation the gas is obtained from the coal in an unburnt state.

The coal to be used for the purpose is placed in closed vessels of iron called retorts, and heated to redness. Volatile bodies are thus formed and expelled, leaving behind coke. The volatile bodies may be distinguished as tar, ammonia, water, and gas. The water passes off as steam, and afterwards, on cooling, forms part of the liquid tar. The gas consists of a mixture of various bodies, some of which injuriously affect its illuminating properties. It therefore goes through a course of purification, and ultimately makes its way into a large vessel called the holder, whence it passes through pipes to all parts of our towns.

The best kinds of coal for gas-making are those of a bituminous or resinous nature, in fact, those which blaze freely and cake together when burning. The very best is the cannel coal of Lancashire. Anthracite, or steam-coal, is the worst kind for the purpose. The coal of South Wales is of this variety. It is an excellent heat giver, but produces very little light.

The coke which is left in the retorts is a familiar substance, being, in fact, much the same as the cinders of our domestic fires. In one case the gas is partly consumed in the fire and partly escapes up the chimney; in the other case the gas is expelled by heat, but collected unconsumed. Coke, as you know, is much used as fuel; and is often mixed with

fresh coal. Formerly most of our locomotives carried coke for feeding their furnaces, but the opinion seems to have become prevalent that coal is cheaper for the purpose.

The coal-tar contains a great variety of substances, from some of which the beautiful aniline dyes are produced. The substance known as aniline is obtained from the tar, and the researches of modern chemists have enabled them to make from it the most extraordinarily beautiful colours now generally used in wool and silk dyeing, calico printing, &c.

The aniline, when treated in one way, gives a delightful colour known as mauve, something like violet; in another way the red aniline or magenta is obtained. Other processes give an aniline blue, a yellow, &c. Two colours, magenta and solferino, were named by their French discoverer in honour of Napoleon III., who gained victories over the Austrians at Magenta and Solferino in 1859, about the time these colours came into use.

One advantageous feature of these dyes is the facility with which they are communicated to the materials on which they are used.

Silks, woollens, &c., are dyed very much more quickly by the aniline process than by the older ones. There seem, however, some grounds for believing that materials of a poisonous nature are in some cases used in the preparation of the aniline dyes. Instances of unmistakable injury to the skin from wearing garments of aniline colours have been brought to light.

Coal-tar is also frequently used for preserving timber from decay. Its preserving properties are owing to certain oily acids which it contains. Chemists are able to extract these oily acids from the tar, and thus get a substance called coal-tar

creosote, which is used for preserving meat from putrefaction.

Many other substances might be mentioned which are derived from the formerly almost despised coal-tar.

Another very important product of the gas manufacture is ammonia, remarkable for its pungent smell. Much might be said of ammonia, or spirit of harts-horn, as it is sometimes called, but it would scarcely belong to our present subject. It is largely collected at gas-works, and used for agricultural and other purposes. Some of it always accompanies the gas as an impurity, and it is its presence which causes the brass gas-pipes to become corroded.

Liquid ammonia in a cheap form is much used in some places, and with excellent effect, for scouring the wood floors of houses.

J. P.

THE INCHCAPE ROCK.

surge, a large wave

*Ab-er-broth-ock', the former name
of Arbroath, a seaport in For-
farshire*

*Inch-cape or Bell rock, a dan-
gerous reef in the German
Ocean, 12 m. S.E. of Arbroath*

may'-in-er, a seaman

per'-il-ous, dangerous

joy'-ance, joy, gaiety

mirth'-ful, merry

quoth, saith

me-thinks, it seems to me

drift, to be driven along

de-spair', want of hope

knell, a funeral bell

No stir in the air, no stir in the sea,
The ship was as still as she could be,
Her sails from heaven received no motion,
Her keel was steady in the ocean.

Without either sigh or sound of their shock,
 The waves flow'd over the Inchcape Rock ;
 So little they rose, so little they fell,
 They did not move the Inchcape Bell.

The worthy Abbot of Aberbrothock
 Had placed that bell on the Inchcape Rock ;
 On a buoy in the storm it floated and swung,
 And over the waves its warning rung.

When the rock was hid by the surge's swell,
 The mariners heard the warning bell ;
 And then they knew the perilous rock,
 And blest the Abbot of Aberbrothock.

The sun in heaven was shining gay,
 All things were joyful on that day ;
 The sea-birds scream'd as they wheel'd round,
 And there was joyance in their sound.

The buoy of the Inchcape Bell was seen,
 A darker speck on the ocean green ;
 Sir Ralph the Rover walk'd his deck,
 And fixed his eye on the darker speck.

He felt the cheering power of spring,
 It made him whistle, it made him sing ;
 His heart was mirthful to excess,
 But the rover's mirth was wickedness.

His eye was on the Inchcape float ;
 Quoth he, ' My men, put out the boat,
 And row me to the Inchcape Rock,
 And I'll plague the Abbot of Aberbrothock.'

The boat is lower'd, the boatmen row,
 And to the Inchcape Rock they go ;
 Sir Ralph bent over from the boat ;
 And he cut the bell from the Inchcape float.

Down sunk the bell with a gurgling sound,
The bubbles rose and burst around;
Quoth Sir Ralph, 'The next who comes to the
rock

Won't bless the Abbot of Aberbrothock.'

Sir Ralph the Rover sail'd away,
He scour'd the seas for many a day;
And now, grown rich with plunder'd store,
He steers his course for Scotland's shore.

So thick a haze o'erspreads the sky,
They cannot see the sun on high;
The wind hath blown a gale all day,
At evening it hath died away.

On the deck the rover takes his stand,
So dark it is they see no land.
Quoth Sir Ralph, 'It will be lighter soon,
For there is the dawn of the rising moon.'

'Canst hear,' said one, 'the breaker's roar?
For methinks we should be near the shore!'
'Now where we are I cannot tell,
But I wish I could hear the Inchcape Bell.'

They hear no sound, the swell is strong;
Though the wind hath fallen they drift along,
Till the vessel strikes with a shivering shock—
'Oh! heavens! it is the Inchcape Rock!'

Sir Ralph the Rover tore his hair;
He curst himself in his despair;
The waves rush in on every side,
The ship is sinking beneath the tide.

But even now, in his dying fear,
One dreadful sound could the rover hear,
A sound as if with the Inchcape bell
The fiends in triumph were ringing his knell.

R. SOUTHEY.

WINDS.

weird, *unnatural, witching, strange*
 tu'mult, *noise, confusion*
 im-pede', *hinder, obstruct*
 au'-di-ble, *capable of being heard*
 shat'-ter-ed, *broken to pieces*
 ze'-phyr, *a soft warm wind*
 hur'-ri-cane, *a fierce swift wind*
 e-vap'-or-ate, *fly off as vapour*
 la'-ti-tu-de, *distance north or south of the equator*
 pe'-ri-od'-i-cal, *occurring at certain times*

va'-ri-able, *subject to change*
 fa-cil'-i-tate, *to make easy*
 e-quas'-tor, *that part of the earth where the sun shines perpendicularly; where day and night are equal*
 pen'-e-trates, *pierces through, enters into*
 in-dis-pen'-sable, *not to be done without*
 de-vout'-ly, *reverently*

CLOSE the shutters, draw the curtains together, let us gather round the warm fireside. Hark, how the wind howls and raves round the house! Listen to the weird utterances of the trees outside. What mysterious thing is this that comes unseen, and stirs this tumult? that has power to fill our hearts, when it wails through the deep night, with such vague, chilling awe? It is the unseen, fitful, ever-changing wind, that in the sweet summer kisses the flowers and lulls the young birds to rest; that howls in winter through the naked branches, or uproots the trees in savage fury from the ground. The wind, that now softly fans the fevered cheeks, and caresses the weary brow, gently as our mother does; and anon, sweeps like a savage monster over land and sea, pitilessly destroying all living things that impede its progress. What is this strange visitor, this welcome friend, this dreaded enemy? Let us see.

All around the globe God has placed a great air-ocean, forty-five miles thick. This we call the atmosphere. All its uses I cannot tell you here, but remember that without it we could not live. It conveys sounds to us. It would be useless to speak, to

sing, to play to others if the atmosphere did not transmit the sounds and make them audible to them. It also presses us on every side, and preserves us from falling, and, that this pressure may not be felt by us, enters into our bodies, which but for this would be soon shattered into fragments, and thus buoys us up in spite of the weight bearing on every part of us. It also keeps the earth moist and green, and preserves vegetable as well as animal life in health.

This wonderful air-ocean has its waves, currents, and storms just as the water-ocean has, only we call them by other names. When it stirs in tiny ripplings, we say there is a soft wind or zephyr; when we feel the rougher waves, we speak of a strong breeze or wind; and when the air-ocean seems tempest-tost and tumultuous, we say, 'What a fearful hurricane!' Winds, then, are movements or motions of the atmosphere or air-ocean.

We must now try to ascertain what causes these motions there. If you take a cupful of water from a vessel, you do not see a hole marking the spot from which you took it. Why? Because when any water is taken away, the water nearest to it rushes in and fills up the gap. It is just so in the air-ocean. When air is taken away, more rushes into the vacant space, and this rushing we call 'a wind.'

But how is the air taken away? In many ways. All living things drink it in continually. Again, all living things breathe out air as well as drink it in; this causes a constant motion in the air-ocean. There is another cause of wind. All bodies lighter than other bodies rise above them and force them down. For example, wood and cork float on the top of water because they are lighter than water; while stone, being heavier, sinks to the bottom. Air when heated becomes light. Heated

air is lighter than cold air. Consequently heated air must rise above cold air; cold air must descend below heated air. We breathe out warm air; the sun warms the air, so that constantly there is warm air rising, and cold air rushing down to fill its place; thus motion, or a wind, is produced.

The sun's heat also acts upon the waters of the earth and causes them to evaporate or ascend in the form of air or vapour into the atmosphere. This flowing-in of new air causes motion or wind. The vapour in the air, too, is constantly being cooled and sent down in the form of rain, hail, and snow to water the earth. This causes a rush of air or wind. Anything, then, that displaces air sets it in motion, or causes wind. There are many kinds of winds. In temperate lands, like our own, winds are not generally very harmful or violent, neither do they blow in certain directions at stated seasons. We may have a biting east wind to-day, and a soft warm wind to-morrow. Our winds, therefore, are said to be variable winds.

Beside these, there are winds that blow regularly for a certain period in one direction. These are called periodical winds. Among them we are most familiar with the land and sea breezes, caused by the heating of the air on land during the day. The warm air rises, and a breeze sets in from the sea in its place. At night the air over the land becomes coldest, thus causing a current of cool air to rush seaward.

Monsoons are periodical winds that prevail in the Indian Ocean, Red Sea and other waters in warm latitudes. But the most important are the *trade-winds*, so called because mariners crossing the ocean in sailing-vessels wait for the time when these blow in their favour in order the more quickly to accomplish their voyages and thus facilitate trade between different nations.

These winds are produced by various causes, and blow chiefly over the ocean. The principal cause, however, is the great heat of the sun at the equator, which rarifies, or warms and lightens the air in those warm regions, and thus causes it to ascend. As it ascends the cold air from the temperate regions north and south of the equator rushes in to fill up its place, and thus strong currents of air or *winds* are produced.

There are many other winds, some of them very destructive to life and property. Such are the *simoom*, a hot poisonous wind, most fatal to animal life, which blows in Arabia, Persia, and other lands, bringing with it a fine dust that penetrates boxes, bundles, and the folds of the clothing, and can only be escaped by lying flat with the face to the ground till it has passed; and the hurricane, a fearful wind common in the West Indies, that rushes at the rate of 100 miles an hour, sweeping away whole sugar plantations, houses, people—everything that comes in its way.

In Africa another fearful wind, called *harmattan*, blows in December, January, and February, and with it comes a fog which hides the sun for days. This wind withers up vegetation, makes the green grass at once dry as hay, and causes the skin of human beings to peel off. It is, however, said to cure infectious and skin diseases.

Though sometimes most destructive, winds are great blessings to the earth. They waft the ships to foreign lands; they purify the air, cool the hot regions, and warm the cold parts of the globe; destroy many noxious insects, scatter the poisonous breath exhaled continually by living things, and bear seeds from place to place, thus clothing even desolate spots where no man dwells with life and beauty. Like all things here, they are not unmixed

blessings, yet they *are* blessings, indispensable to our life below, for which we should devoutly thank the great God who 'hath His way in the whirlwind and the storm,' and who Himself rideth on the wings of the wind.

S. C. C.

STARCH FOODS.

ARROWROOT AND SAGO.

de-ter'-mine, <i>to make up one's mind</i>	es'-ti-mate, <i>to value</i>
ob'-vi-ous, <i>easily seen or understood</i>	ad'-junct, <i>one thing joined with another</i>
es-sen'-tial, <i>that cannot be done without</i>	fi'-brous, <i>composed of little threads</i>
com-bus'-tion, <i>the act of burning</i>	ex-port-a'-tion, <i>the sending out of one country into another</i>
se-cre'-tion, <i>matter in plants and animals set apart from the rest</i>	ad-ul'-ter-at-ed, <i>mixed with an inferior substance</i>
nu-tri'-tious, <i>nourishing, feeding the body</i>	mem'-brane, <i>a thin skin</i>
gen'-er-ate, <i>to produce</i>	de-fi'-cient, <i>wanting</i>

In determining the value of any kind of food, there are several points to be considered besides the obvious ones of quantity and price; two of these are the purpose for which we want the food, and the power of the stomach in digesting it; for food may be excellent for a particular purpose, and yet be unsuitable for the one for which we need it, and it may be suited to one in vigorous health, but not to an invalid or delicate person.

Food is intended to serve two important ends: first, it is required to supply materials for repairing that waste of the body which is constantly occurring. Every vital action—the drawing-in of air through the lungs, the beating of the heart, the movements of the limbs—tend to wear out the tissues which are brought into action. If food did not supply material for renewing what is thus

wasted, the body would dwindle and die. But in order that food may be really nourishing, it is needful that it should contain in itself the same chemical elements which are found in the flesh. One of the most important of these is nitrogen; no food which does not contain nitrogen can be of any service as a flesh-former.

But food is needed for another purpose, namely, to keep up that degree of heat in the body without which life could not exist. For this purpose the essential element is carbon, and for it nitrogen is not needed.

Food is supplied chiefly, and always in the first instance, from the vegetable kingdom; though man feeds on beef and mutton, the oxen and sheep have been fed on grass, so that man may be said to depend indirectly on the herb of the field for his subsistence. Now all parts of the vegetable eaten are not real food; that is, they do not serve either of the purposes mentioned, nutrition of the fibres or combustion. The real feeding parts occur in what are called the secretions, generally in small grains lying in the cellular tissue of the plants or floating in their juices. We may divide these secretions into those which do and those which do not contain nitrogen. Of the nutritious secretions, the most important are gluten, a substance found largely in wheat and most other grains; casein (which is essentially the same as curd of milk), found in ripe peas and beans; and albumen, a substance like the white of eggs.

Of the non-nutritious secretions, there are three most important ones — fat, sugar, and starch. How suitable they are for maintaining the heat of the body may be easily known by observing how readily they burn. Of the three, fat contains the greatest proportion of heat-giving power, and for that reason is most

extensively used by the people of cold climates. As far as nutrition is concerned, it matters little whether we eat food containing gluten, casein, or albumen, though as these are not equally digestible, one may be much more suited than another for particular persons, such as invalids and little children. Again, as regards the power of maintaining heat, it is of little consequence whether our food consists of sugar, starch, or fat; yet each varies in regard to its digestibility, and the amount of heat it generates. Of the three, starch is the most generally wholesome. Many kinds of vegetable food contain little beside starch. In reckoning, therefore, their value as food, we must be careful to estimate them only for what they really are, and not expect them to do for us what they never can do, namely, nourish the flesh. Potatoes and rice are instances of food consisting chiefly of starch. Still, both these contain some gluten, and are therefore both capable of sustaining life; though, if either of them were the only food used, it would be necessary to consume a much larger quantity than would be needed if a greater proportion of the nutritious elements existed in it.

There are, however, some preparations of vegetable food which consist entirely of starch, and which, therefore, can never by themselves support life, so that it is needful either to combine more nutritious elements with them in the process of cooking, or to use them only as adjuncts to really nourishing food. Among these, two of the best known are arrowroot and sago. Arrowroot is prepared from a tuberous root, something like a potato, which grows in India, South America, and the West Indies. The name of the plant is *maranta*, of which there are several species, distinguished by additional botanical names. The starch is separated from the

fibrous matter, gluten, &c. (as anyone may easily separate potato starch), by grating the root and washing the pulp in clear water. The pulp which contains the fibrous part is then strained from the water, in which the starch remains. This water is milky in appearance, and when allowed to settle becomes clear, the starch falling to the bottom. After the water has been poured off, the starch is dried in the sun, and is then packed for exportation. West Indian arrowroot is of a pure white colour, while that obtained from the East Indies is yellow. It is often adulterated with potato-starch.

It must be remembered when preparing arrowroot for food that each grain of starch consists of a little bag of a gum-like substance, and that the membrane which joins the bag can only be dissolved by a boiling heat. In cooking arrowroot, after first mixing the quantity required with a little cold water, a sufficient quantity of boiling water must be poured on to it, and stirred all the time to prevent it from forming into lumps. Milk is generally preferred to water, as it contains in itself very nutritious elements, and so supplies to the arrowroot that in which it is deficient. If made into puddings, it should be mixed as above stated, beaten eggs, sugar, and spices being added according to taste, after which it should be poured into a buttered dish and baked.

Sago, like arrowroot, is almost entirely composed of starch, but it has a different origin. It is obtained from the pith or soft inner part of the trunk of a kind of palm-tree growing in the south-east of Asia. After the tree is full-grown, a kind of white dust comes through the leaves, by which it is known that the sago is ready. The tree is then cut down, and the trunk sawn into lengths of five or six feet. The pith occupies a kind of hollow tube in the

middle of the trunk. Part of the hard wood is then sliced off, and the pith scooped out. This pith consists partly of woody fibres, so that it has to be washed, beaten, and strained to separate the starch. Sago generally comes to us in small grains. These are formed by passing the starch through a sieve, and dropping the pieces on to an iron plate heated over a fire, so that it is half baked before we obtain it, which makes it keep the better. Sago is much esteemed as a light and digestible food for infants and invalids; in the main, its preparation as an article of food is much the same as that of arrow-root.

E. T.

THE TURKS IN CONSTANTINOPLE.

ob-ser-va'-tion, *notice, attention*
 re-mote'-ly, *far off*
 pro-tract', *to lengthen*
 vis'-ion, *sight*
 verb'-al, *expressed in words,*
 spoken
 en-hanc'-ed, *increased in value*
 ab'-so-lute-ly, *entirely, completely*

pre-ca'-ri-ous, *uncertain, not safe*
 re-in-state', *to put a person or*
 thing back into its place
 fa'-tal-ist, *one who believes in*
 fate
 in'-cul-cat-ed, *taught*
 con-fla-gra'-tion, *a great fire*

NEXT to the pleasure of making personal observations of the habits of nations remotely situated from the sphere of one's home, is that of perusing the accounts which are from time to time published by enterprising persons who possess the means of making protracted journeys, and the leisure to take careful note of everything that comes within the range of their vision, and the information derived from verbal inquiries. The pleasure experienced in reading these accounts must often be enhanced in proportion to the difficulties which travellers fre-

quently encounter in pursuing their researches. Thus, for instance, in Turkey it is no easy matter to gain an entrance into Turkish houses; and, indeed, a man has never been known to gain admittance to the presence of the women of a household. To ladies only has this favour ever been granted. The Turks are very shy of making acquaintance with strangers. When a gentleman visits a Turk, it is not considered at all complimentary to his manhood to make inquiries after his wife or wives, for sometimes he has two or three. The head of the family, or harem, would blush like a great school-girl at the faintest reference to his women folk.

The Turks are described as the best socially-conducted people in the world. In Constantinople there are never any street riots in which Turks are found mixed up; nor are there any drunken natives ever to be met with. Such a contingency as a Turk ruling his home to the terror of his wife and family is absolutely unknown. After dark, the streets are so quiet that the silence is only broken now and then by some individual going home followed by a servant bearing a paper lantern, the bark of some uneasy dog, or the echo of a watchman's staff, as he strikes it heavily on the pavement. The lantern at night in Constantinople is a necessary precaution against accidents, as the streets are so ill-paved it would otherwise be impossible to proceed.

A Turk, whatever his present lot, is said to be always satisfied with it. Thus, the possession of property is too precarious for him to have any lasting hold of it. A change of Government may to-day strip him of everything; but then again, the wheel of fortune may to-morrow take a favourable turn, and re-instate him. He is just as con-

tented under the calamity of fire—a feeling no doubt inculcated by the principles of his religion, for the Turk is a fatalist. It is well for him that he is enabled to remain passive and unconcerned under adverse circumstances, for there is, perhaps, no city in the world more subject to sudden and overwhelming outbreaks of fire than Constantinople. The houses being composed generally of wood, they become as susceptible to a spark as tinder, and it is seldom that less than one whole street is burned down before the conflagration is stayed. The Turks are indolent to a degree, and dislike all changes. A sultan who makes innovations upon the old customs is sure to be unpopular, and his subjects will resist him to the utmost. A Turk is inordinately vain, and is consequently open to the grossest flattery, and believes himself so perfect that he never feels any desire to improve himself.

The Turks as a nation are most merciful to all animals of the brute creation. A Turk will never kill an unweaned lamb, because doing so would cause suffering to its mother. Dogs haunt the streets in large numbers. These creatures have no owners, yet it is a great offence to kill one. The amount of fine inflicted on a dog's murderer is usually decided in the following manner: the dead dog is hung up by its tail, so that its nose shall touch the ground; then the dog-slayer is compelled to pile his own corn, or millet seed, around it until the body is entirely hidden. This corn is afterwards taken possession of by the proper authorities, and distributed to the poor. The cost to the offender is generally about 1,000 piastres.

The Turks have great affection for their children: this trait is particularly observable in a father. In sickness he will often tend them with the greatest care. These people carry their love for children so

far, that a Turk will often adopt a child into his family, and this child is called 'the child of the soul.' Nor is it made a plaything of for a time and then ill-treated or neglected; but it is always cared for, even when the family of its adoption is overtaken by poverty. A Turk holds his mother in the greatest reverence; she is his adviser on all occasions, and her advice is always taken. But his wife he treats with scant respect. He will give as his reason for this, that his wife he can always replace, but his mother never.

The Turkish women are almost wholly uneducated. They are amused with trifles, and are childish in their ideas. Their habits are extremely indolent and luxurious, and their time is chiefly occupied in dressing, attending the bath, or in sleep. This latter they seem to be able to indulge in at will. In winter they have only to nestle under the coverings of the *tandour* (a wooden frame covered with a liberal supply of wadded wraps), or in summer bury themselves among their cushions, and in five minutes they are asleep. When they go out visiting, or on shopping excursions (of which latter they are passionately fond), they wear yellow boots reaching far above the ankle, and over them a clog, or slipper, of the same colour. The face, with the exception of the eyes and nose, is entirely veiled by a white muslin cloth, called a *yashmac*, and the person is wrapped up in loose garments composed of blue or yellow silk. A Turkish woman when thus habited presents anything but a graceful appearance. In the house they are more attractive. As a rule, they wear an under garment of silk or similar material, trimmed with fringe or narrow ribbon; wide trousers of silk of various colours, and not unfrequently of printed cotton, reaching to

the ankle. The upper dress is made in one piece, divided at the hip throughout its whole length, and girt round the waist with a Cachemir shawl. This dress is completed in winter by a tight vest lined with fur.

The female children are dressed in the same manner at two as the women are at twenty years of age, and, like the latter, are of very indolent habit.

In a Turkish household there are often many slaves, who are bought by their masters; but their position is by no means painful. They are treated kindly, and are really adopted members of the family. Should a slave wish to change masters, he or she requests to be again sold; and after a third request can demand this change of servitude according to law.

J. K.

RAIN AND DEW.

re'-ser-voir, a place where water is stored	dis-as'-trous, unfortunate, in- jurious
grad'-u-al-ly, by degrees	ad-ja'-cent, lying near
at'-mo-sphere, the air	ra-pid'-i-ty, quickness
a'-er-o-naut, one who sails in a balloon	co'-pi-ous, plentiful, abundant
de-sign'-ed, intended	del'-ug-ed, flooded
mag-nif'-i-cence, grandeur	in-vis'-i-ble, that cannot be seen
dis-trib'-ut-ed, spread	im-per-cept'-i-bly, so as not to be seen or felt

THERE is no more striking evidence of the wisdom of the great Creator's operations in the economy of nature than that seen in the constant rotation of the waters of the earth.

Not only the gracious rains which bring life and freshness to all nature, but the springs, the lakes, and the rivers which are continually rolling their

great volumes of fresh water as if in grateful tribute to the sea, all derive their origin from one vast reservoir—the ocean.

The sun, in his great power and majesty, shines down upon this immense expanse of water, drawing up from its broad surface a vapour invisible to the eye, and so light—lighter than even the air itself—that it gradually rises higher and higher into the atmosphere.

Now the air surrounding our earth varies in temperature, not only in proportion to the climate of the country or season of the year, but to its distance from the earth. The higher we rise—in ascending a mountain, for instance—the less is its heat; and aëronauts, when making a balloon ascent, even in summer weather, have found themselves benumbed with cold at half-a-mile's distance above the earth. As the vapours ascend into the cooler regions of the atmosphere they become condensed into the visible form of clouds, and these, carried along by the wind, spread themselves far and wide over the earth to perform the important services for which they were designed.

Even in their cloud-state they are of use, acting as a curtain to shield the earth from the burning rays of the sun; and all will acknowledge who have noticed their constant changefulness of form and magnificence of colouring when massed like the great mountains of a world of glory around the setting sun, that they are sometimes of wondrous beauty too. But it is as rain-stores that the clouds are of the greatest importance to us. After having been borne along in the air for a greater or less period of time, according to the character of the wind and general condition of the atmosphere, they become still further condensed by the cold air, or by coming into contact with the snowy

summits of mountains, and forming into drops, descend upon the earth in a fertilizing shower of rain.

Though rain is common to most countries of the globe, it is by no means equally distributed, but falls in very variable quantities in different parts of the world. Countries near the sea have more rain than those which are far inland, because the clouds are charged with moisture drawn from the adjacent ocean. For this reason our own island of Great Britain has many rainy days, and the number of these increases as we approach the coast. In England, and many other countries of the temperate regions of the earth, rain falls indiscriminately by day or by night, and at any season of the year; thus the weather becomes a general topic of conversation and frequent cause of anxiety. On the other hand, in many districts—Judæa, for example—rain falls but twice a year, and at such regular periods that the inhabitants can tell to within a few days when the downpour will commence, how many weeks it will continue, and when it ceases they know they may look forward to uninterrupted bright weather for several months to come. These rainy seasons are called in Scripture ‘the former rain and the latter rain,’ and when, as sometimes occurs, these are withheld, famine nearly always ensues.

Generally speaking, rain falls in much greater abundance in very warm countries than elsewhere, owing to the rapidity with which vapour is drawn up by the intense heat of the sun; yet the number of rainy days in the year is less than with us, because the showers, though composed of enormous drops, and falling in perfect torrents, are only of brief duration and are limited to a few months of the year.

While thus countries near the equator are frequently almost deluged with rain, there are some

districts at no very great distance from it where rain is never known to fall. The Sahara, or 'Great Desert,' of Africa—a vast, dreary, uninhabited waste of sand and stones thousands of miles in extent—is one of these regions, and there are others, both in Africa and Asia, which would be equally arid, barren, and desolate were they not watered by the overflowing of some large river, or by the copious falls of dew which in many places almost supply the place of rain.

Dew is a common phenomenon in many parts of the world; and there are few persons who are not familiar with the fact that at the close of a fine warm summer day the grass and shrubs become covered with moisture, and in the early morning, before the sun has attained any great power, the hedges, rows, bushes, and flowers are beautifully spangled with glittering drops of crystal dew. This wonderful arrangement of nature, so refreshing to the earth and beneficial to vegetation, is caused by the rapid cooling of the earth after sunset.

During the heat of the day invisible vapour is drawn up into the atmosphere; when the sun has set, and the great source of heat is thus withdrawn, the surface of the earth quickly becomes cool, and chills the air immediately above it. Gradually the moisture in the air becomes changed into tiny drops, which are gently and imperceptibly deposited on the grass and plants in the form of dew. To farmers and gardeners dew is of great value, especially in a dry season, and in countries where showers are rare. In Palestine it falls heavily, and from the long periodical absence of rain is of such great importance, that in Scripture it is frequently used as a beautiful emblem of spiritual blessing. Isaac's blessing pronounced upon his son Jacob includes the prayer, 'God give thee of the dew of heaven;'

and Hosea, in describing the nature of the Divine favour, says, 'I will be as dew unto Israel.'

Dew falls more abundantly in the open country than in towns, because the earth, when unscreened by walls or houses, and covered with verdure, cools more rapidly than sheltered or bare ground. Thus the grass and herbs receive the nourishment they require, while the bare earth, to which the moisture would have been of little actual benefit, remains comparatively dry. Sometimes the cooling of the earth after sunset is so great that the temperature is brought down to freezing point, and the liquid dew-drops become changed into tiny crystals of ice called hoar-frost, or the frost of dew. This is a very common occurrence in the spring, and very destructive to the products of our kitchen gardens and orchards, the prospects of a bountiful year of produce being often destroyed in a single night. In order to prevent such disastrous effects, gardeners generally cover their tender plants before sunset with a light cloth or thin layer of straw, which protects them by checking the escape of the warmth of the earth.

M. M. W.

THE ENGLISHMAN.

a-ver', to say, to declare
do-main', a country, an empire
aught, anything
trav'-erse, to travel over or across

haugh'-ty, proud, scornful
char'-ter, a written document
conferring privileges

THERE's a land that bears a world-wide name,

Though 'tis but a little spot,

'Tis the first on the blazing scroll of fame,

And who shall aver it is not?

Of the deathless ones who shine and live
In arms, in arts, in song,
The brightest the whole wide world can give
To that little land belong.
'Tis the star of the earth, deny it who can,
The island home of an Englishman.

There's a flag that waves o'er every sea,
No matter when or where ;
And to treat that flag as aught but the free
Is more than the strongest dare :
For the lion spirits that tread the deck
Have carried the palm of the brave,
And that flag may sink with a shot-torn wreck,
But never floats o'er a slave.
Its honour is stainless, deny it who can,
The flag of a true-born Englishman.

The Briton may traverse the pole or the zone,
And boldly claim his right,
For he calls such a vast domain his own
That the sun never sets on his might.
Let the haughty stranger seek to know
The place of his home and birth,
And a flush will pour from cheek to brow
While he tells of his native earth.
'Tis a glorious charter, deny it who can,
That's breath'd in the words, 'I'm an Englishman.'
ELIZA COOK.

THE OCEAN.

el-e-va'-tions, *heights*
 sub-mar-ine', *under the sea*
 con'-ic-al, *shaped like a sugar-loaf*
 ant-arc'-tic, *opposite to the Arctic*
 Ocean
 ce-sen'-tial, *that cannot be done*
 without
 sim-ul-ta-ne-ous-ly, *at the same*
 time
 lus'-trous, *bright, shining*
 u'-ni-form, *equal, even*
 im-ped'-i-ment, *a hindrance*

vol-can'-ic, *formed by volcanoes*
 ac-ca-mu-lat-ed, *collected, heaped*
 up
 ag'-i-tate, *to disturb, to move*
 violently
 mam'-mals, *all animals which*
 suckle their young
 u'-ni-valve, *having one shell*
 bi'-valve, *having two shells*
 equa-to'-ri-al, *lying near the*
 equator.

ALL round the vast globe on which we live rests water, which is kept near to the solid earth by that wonderful power which we call 'the attraction of gravitation,' the same power which pulls us back so quickly if we attempt to jump away from the earth—to the moon, for instance.

This vast mass of water we call the ocean, but though water lies thus all round the globe, every part of it is not covered. If the surface of the earth were level, that of course would be the case, and we reckon that if it were so the water would rise to the height of 8,000 feet, or about one and a half miles over every part. But the wise Creator of all, who intended the earth to be the habitation of man, and countless other living creatures, has made its surface extremely irregular; in some places sinking into deep hollows, in others rising into elevations. As it is the nature of all liquids to find the lowest level, the water fills the hollows, rises to a certain uniform height above the centre of the earth, and leaves the higher parts dry. If there were more water, that level would be higher and more of the surface would be covered; if there were less, the level would be lower, and more of the land would be kept dry. It will be easily imagined from this that

the bottom of the ocean is not an even floor, but presents, at least, as great variety as the parts which stand above the sea-level; and when we remember that nearly three-fourths of the earth is covered by the ocean, we shall see the probability of the inequalities being even greater.

Thus, while we find that the highest elevation on the earth (Mount Everest, in the Himalayas) is about five miles in perpendicular height above the water-line, a depth of more than eight miles has been measured below the surface of the Pacific Ocean. The bottom of the ocean is supposed to exhibit all the features of land geography; wide flat levels of greater or less extent, deep hollows or valleys, table lands but little below water-mark, steep ridges of rocks, which are sub-marine mountain chains, and the tops of which often actually rise above the water, and form what we call islands.

Thus, off the west of Ireland there is a very extensive sub-marine table-land which may probably some time be lifted higher up by those forces of upheaval which we know have been and are constantly at work, so that another island of considerable extent will probably some time be formed between our islands and America. The Island of Teneriffe is the top of a vast conical mountain rising from a very great depth.

The ocean is but one. Except for the impediment offered by the ice round both poles a vessel might freely pass to every part. It is only for convenience we have given particular names to the different portions. Thus the part lying between the western side of that great continent which contains Europe, Asia, and Africa, and the eastern shore of America, is called the Atlantic Ocean; that which lies to the west of America and east of Asia and Australia we call the Pacific; while that lying to the south of

Asia is called the Indian Ocean ; and round the north and south poles respectively are the Arctic and Antarctic oceans. Of these, the Pacific is by far the largest, occupying an area of 100,000,000 square miles, or nearly half the surface of the globe. It has numerous groups of small islands, many of them of coral formation, and others of volcanic origin. Both its eastern and western coasts rise into high mountain-ranges, containing most of the volcanoes in the world. It does not form inland seas, excepting that on its western side it is partially enclosed by groups of islands which lie near the coast.

The Atlantic Ocean is much smaller, being about 30,000,000 miles in extent. It is about 9,000 miles long, and varies in width from 800 to 3,600 miles. It is distinguished by the great number of inland seas which are included in its basin, especially on the eastern side, where the important inlets of the Mediterranean, the Black Sea, the North Sea, and Baltic occur. On its other side there are Hudson's Bay and the Gulf of Mexico. The islands in this ocean are not so numerous as those of the Pacific, but are very important, including the British and West Indian islands. The coasts on both sides are generally comparatively level, and not volcanic. The Indian Ocean, lying south of Asia, is smaller than the Atlantic, and it has a few important islands, as Madagascar and Ceylon, besides small groups, both volcanic and of coral formation. An enormous group of islands, consisting of Australia and the East Indian islands, divides the Indian Ocean from the Pacific. The southern parts of the Pacific and Indian oceans are called the Southern Ocean, which passes, without any exact line of boundary, into the Antarctic. The Arctic, on the contrary, is nearly enclosed by the shores of Europe, Asia, and North America. Both the Arctic and Antarctic are,

to a great extent, blocked up with ice, and the immediate region of the poles has never been explored.

The ocean is the great reservoir of the waters of the world. Nearly all the rivers empty themselves into it, but, on the other hand, it supplies to the atmosphere, by the process of evaporation, the moisture which, after passing through the various stages of cloud, rain, springs, and streams, returns into the great rivers, which again carry it to the ocean. The evaporation is much greater in the equatorial than in the colder regions.

Sea-water holds in solution a vast quantity of mineral matter, the accumulated washings brought down by the rivers for thousands of years, as well as those supplied from the rocks which form the ocean-floor.

The chief of these are salt, magnesia, and lime; but probably there is no metal which does not exist there in some proportion. Gold has been procured from it but only as a matter of curious experiment, for the expense of extracting it would be far greater than the profit derived from it.

Salt forms nearly two-thirds of the mineral matter contained in sea-water, and is essential to its preservation in a wholesome condition.

The waters of the ocean are constantly moving. Its surface is agitated by winds, which cause the ripple of the waves and the swell of the billows. Then there are certain regular movements of the waters in fixed directions, in particular localities, which we call currents. An ocean current, flowing steadily on within marked limits, with comparatively still water on each side, is, in fact, an ocean river, with water for its banks. Lastly, there are the tides, which are regular swellings or risings of the waters on the two opposite sides of the earth simultaneously,

occurring every twelve and a half hours, and caused by the greater attraction of the sun and moon upon the fluid than upon the solid mass of the globe.

The ocean is full of life, both animal and vegetable, though it is probable that none but the lowest types occur at great depths. Sub-marine plants are often extremely beautiful both in form and colour, and the infinite variety exhibited by the animals is truly wonderful. To say nothing of the whale, and its relations the walrus and seal, which are not really fishes but mammals, and which abound in the polar regions, there are the cruel and hungry sharks and sword-fish, the beautiful dolphins, the curious flying-fish, and hosts of others differing quite as much in size, form, colour, and habits as the inhabitants of the land. Then there are the shell-fish, with their coverings of lustrous pearl, rosy pink, and brilliant blues, greens, and crimson—univalve and bivalve, twisted, fluted, or scalloped. Lastly, there are the wonderful corals in every variety of form of growth, showing through the clear waters of the tropical oceans like perfect gardens of beauty, forming solid walls of living rock, rising above the waves, and preparing habitations for future generations of men.

E. T.

WEIGHTS AND MEASURES. (I.)

LONG MEASURE.

pur'-chase, to buy	ca-pa'-ci-ty, the power of holding or containing things
re'-cog-niz-ed, understood, known, agreed to	di-urn'-al, happening daily
re-sult', to follow, to be caused	cir-cum'-fer-ence, the line which encloses a circle
ad-apt'-ed, fitted, suited	girth, the distance round a body
im-pe'-ri-al, relating to the go- vernment of an empire	en-act'-ed, commanded by Act of Parliament
part'-i-cle, a little part	stat'-ute, a law
et-y-mol'-o-gy, the root from which a word comes	stat'-ue, an image

It is very important that we should be able to estimate correctly the quantities of the articles which we buy or sell, or use. For instance, if a woman purchases tea she wants to know exactly how much she ought to have for a certain amount of money, or how much money she must give for a certain quantity of tea. If the price of the tea is three shillings per pound, it is important that she should know how much she must give for the two ounces, quarter of a pound, six ounces, or more, which she wants to purchase. So with flour, meat, milk, calico, &c. When a builder purchases timber he wants to know exactly how much he gets for his money. When a farmer rents land, he wants to know how many acres he has to cultivate, otherwise he will not know how much manure, seed, or labour he will require, nor what the produce of his fields ought to be.

It becomes necessary, therefore, that we should have certain standards of weights and measures recognized by everybody, in order that people may deal fairly with one another, and understand what is meant by others when they speak of various quantities of things. For if you were to buy and sell

meat by the joint, without weighing it, sugar by the shovelful, and tea by the handful, endless confusion, loss, and disagreement would result.

The common weights and measures are not difficult to be understood by children when small quantities are concerned, but as they may in after life have to do with much larger quantities and calculate their value, it is important they should understand them.

You scarcely need to be told that different kinds of things require to be measured in different ways. For instance, you cannot measure a joint of meat in the same way that you would measure a pint of milk, except by weighing them both; but this method would be found very inconvenient in the case of the milk, and would waste much time. So, although you might measure the quantity of timber in a large tree by weighing it, as you might ascertain the quantity of coals in your cellar by taking them out and weighing them, you would find it very inconvenient.

It has been found necessary, therefore, to adopt various tables of weights and measures adapted to the various kinds of things in use. These weights and measures, having been established by Act of Parliament, though they were in use many years before, are called *Imperial*.

We may divide the various things to be measured into four classes—*First*, those which must be measured by a line, such as a tape or rod, marked with inches, feet, yards, &c. *Second*, those which it is most convenient to measure by bulk. Such are the various substances which consist of grains or particles easily separated from one another without injury, as wine, beer, corn, &c. These are calculated by the pint, quart, gallon, peck, or bushel, which are called measures of capacity, from their containing

or holding the things to be measured. *Third*, those which would be injured by being cut up into small pieces in order to measure them, as meat, coals, &c., or which it may be for other reasons more convenient to weigh. *Fourth*, the measure of time, which is based upon the diurnal motion of the earth.

The bodies which are measured by line are, for the most part, such as have some regular figure or shape, and, of course, mere distances are measured in this way. In fact, all things of this character are measured by distance, *i.e.*, the quantities are estimated by the distance of various points in them from other points. Thus in finding the quantity of carpet required for a room, we have to measure the length as well as the breadth of the latter. In finding the area of a circle, we must ascertain the distance of the centre from the circumference or the length of the circumference. In estimating the quantity of timber in a tree we must measure its length as well as its girth. All these dimensions are measures of length. So when we speak of the length of a road or of a stick, or the height of a tree or a mountain, the only idea we wish to convey is that of the distance from one point to another, from the beginning to the end of the road, or from the bottom to the top of the mountain. The measure by which these are estimated is therefore called long measure, and as we speak only of the length, saying nothing about breadth or thickness, it is called a measure of *one dimension*.

The unit of long measure is the inch, which is said to be the length of three average grains of barley, or barleycorns, joined together in line. It was, indeed, enacted by a statute of Edward II., in the year 1324, that three barleycorns, round and dry, should make one inch, twelve inches one foot, &c. But this mode of measuring by the length of barley-

corns is very indefinite, because we do not know how much of their pointed ends must be worn away.

Twelve inches make a foot, so called because it is about the length of a man's foot. It is worth while to mention, however, that a human foot twelve inches long would be that of a very tall man, the average length of an Englishman's foot being only ten and a quarter inches. If a man of ordinary size had a foot twelve inches long, it would be out of proportion to his body.

Three feet make a yard, which is a word having no special meaning of its own, except that of rod or pole, which survives in the sea terms, yards, sail-yard, halyard, &c. It is said, but on rather doubtful authority, that Henry I. ordered that the yard should be the length of his arm.

Five and a half yards make a pole, rod, or perch. These words, like yard, appear to have no special signification. We all know what poles and rods are, and perch appears to be derived from the Latin word *peritica*, which meant a long rod or pole for measuring with. The only similar sense in which we now use the word is in that of a rod or stick on which birds roost.

Forty poles make one furlong, a word whose etymology is rather doubtful. Some say it is a shortened form of *furrow-long*, being the length of furrow which a team of horses will plough going forward before they turn. But as a furrow is always made straight across a field, and fields vary in size, such a word as 'furrow-long' would convey no definite idea of length at all. Others think the word furlong is an abbreviation of forty-long, *i.e.*, forty perches long, and this derivation, though it seems rather improbable, is much more reasonable than the other.

Eight furlongs make one mile. This is a word derived from the Latin *mille*, a thousand, a Roman

mile having been a thousand paces in length. A pace, from the Latin *passus*, is two steps, *i.e.*, five feet, the regulation length of the step in the British army being two feet and a half. One thousand paces, therefore—*i.e.*, a Roman mile,—would be five thousand feet, while an English mile is five thousand two hundred and eighty feet.

There are certain other measures of length used for particular purposes, the most important of which are the nail, the hand, the cubit, the ell, the fathom, the chain, and the league.

The nail is used only in measuring cloth. It is two and a quarter inches in length, and is supposed to be the distance between the middle joint of the first finger and the end of the nail. On measuring mine, I find it exactly two and a quarter inches. It is worth notice that various parts of the body have given names to measures of length, and that not only in our own language but in most others as well. Thus we have nail, hand, cubit (Latin, *cubitum*, the elbow), foot, and, in old books, digit and palm. A digit, or finger, was the breadth of four barley-corns placed side by side, which gave the average breadth of a man's finger, and was more reliable than taking three barleycorns in length for one inch, because, though the length of grains of barley vary considerably, their breadths vary but little. Four of these digits made one palm, measured across the middle joints of the fingers. Four palms made one foot, and six palms one cubit, *i.e.*, the distance between the elbow and the tips of the extended fingers. The cubit mentioned in the Bible is usually supposed to have been twenty-two inches in length.

The hand is used in measuring the height of horses, which is calculated from the bottom of the hoof to the top of the shoulder. By a statute passed

in the reign of Henry VIII., it was enacted that the hand or handful, as it was then called, should be four inches. Doubtless the use of the hand for this purpose was a matter of great convenience, for men usually have their hands with them whether they go to purchase horses or anything else. On measuring my hand across the palm, and including the thumb, I find it exactly four inches.

The ell is used in measuring cloth, and was formerly in much greater use than now. The English ell is forty-five inches, *i.e.*, a yard and a quarter. The Flemish ell is only three quarters of a yard, *i.e.*, twenty-seven inches, while the French ell is a yard and a half. The word ell is said to be derived from or related to the Latin *ulna*, which means the elbow, but which was used by the Romans as a measure of length. Some of them, indeed, say it was as much as a man could clasp with both arms.

The fathom is six feet, and is used almost exclusively in measuring at sea. Thus the sea is always said to be so many fathoms deep, or a cable so many fathoms long. It appears to be an early English word, and to have always borne the same meaning.

The chain is used for measuring land. It consists of one hundred links of iron or brass wire, and is twenty-two yards, *i.e.*, sixty-six feet, in length. Ten chains equal a furlong, or two hundred and twenty yards; and eighty chains, or eight furlongs, make a mile.

The league is three miles, and is almost universally used for measuring distances at sea.

E. T. S.

WEIGHTS AND MEASURES (II.)

SQUARE AND CUBIC MEASURES.

es'-ti-mate, *to value rightly*
 par'-al-lel, *running side by side*
at an even distance, so as never
to meet

scis'-sors, *small shears*

en-deav'-our, *to try, to attempt*

read'-i-ly, *easily*

tri'-an-gle, *a figure whose sides*
are three straight lines

as-cer-tain', *to find out, to make*
certain

men-su-ra'-tion, *the art of mea-*
suring the contents of surfaces
or solids

con-ve'-ni-ent, *handy, useful*

cal'-cu-late, *to reckon*

pre-cise'-ly, *exactly*

WE now come to those things of which we wish to estimate, not only the length, but the breadth also, such as the floor of a room, or the surface of a field. This must be done by what is called a measure of two dimensions, *i.e.*, length and breadth. And because a square extent of surface is taken as the unit, it is called square measure, and because it has to do, not only with the length or breadth, but with the whole surfaces or superficies of things, it is called superficial measure.

If you take a large sheet of paper and cut it exactly square, and a foot each way, it will represent a square foot. Now take a foot rule and mark off the inches carefully on the edges of the paper. Join the points you have just marked by parallel straight lines drawn carefully with your ruler. Now examine each little square carefully, and count them. You will find that each one is exactly square and an inch each way, and that there are 144 of them in twelve lines of twelve each. So we say that 144 square inches make one square foot. But what is called a square foot of surface is not necessarily square. It may be any shape, indeed. You wonder how this can be, perhaps? Well, attend carefully, and I will endeavour to explain it to you. Take a pair of scissors, or a ruler and a sharp knife, and cut up the square foot of paper, which you prepared

just now, into square inches, by carefully cutting along all the lines. Now each of these pieces is a square inch, and there are 144 of them, and you can readily understand that if joined together again, in whatever figure, they will still be 144 square inches; no more and no less. You may put them side by side in a straight line, which will be 144 inches, *i.e.*, twelve feet in length, but yet it is the very 144 square inches, the very square foot of paper you had at first. Then you may cut each of your little squares into as many smaller squares and triangles as you please, but as long as you fit them close together, they will still be nothing more nor less than a square foot, whatever figure you may make of them. The same remarks, of course, hold good with respect to square yards, poles, roods, acres, and miles. When we speak of a square inch, foot, &c., we mean such an extent of surface as would be equal to a square inch or foot, whatever its figure might be. I do not purpose here to teach you how to measure surfaces so as to ascertain the number of square inches, feet, &c., in them. Your teacher will do that in an arithmetic or mensuration lesson.

Nine square feet make one square yard; for if you take a square sheet of paper a yard each way, and divide the edges into feet, as you divided the square foot of paper into inches, and cut across the lines, you will find that you have divided the whole sheet into nine smaller ones, each of which is exactly square and exactly a foot each way. In other words we say, the square of three is nine.

Thirty and a quarter square yards make a square pole, rod, or perch. You wonder, perhaps, why persons chose so hard a number to multiply or divide by as thirty and a quarter. But the reason is that this number is the square of five and a half (five and a half yards make a pole in long measure, remember),

i.e., if you had a sheet of paper five and a half yards each way, and were to divide it into yards as you did the previous sheets into inches and feet, you would find thirty and a quarter square yards in it. For five and a half multiplied by five and a half give thirty and a quarter, which, for the reason I have already mentioned, is called the square of the quantity.

Forty poles make one rood, a word which is corrupted from rod. A rood was a stick or a piece of timber. Hence the large wooden figure of the cross usually set up in churches many years ago was called the rood.

Four roods make an acre, and it is very useful to remember that an acre is 4,840 square yards. The word acre, which is only used in square measure, and is only applied to land, meant at one time any field, and the churchyard was commonly called 'God's acre.' It was not till about the reign of Edward I. that acre came to mean a portion of land of a particular size.

Six hundred and forty acres make one square mile, *i.e.*, if you were to take a square piece of land a mile or 1,760 yards each way, you would find it contained 640 times 4,840 square yards; in other words, 640 acres. The square rod, consisting of thirty and a quarter square yards, or $272\frac{1}{4}$ square feet, is used by builders in measuring brickwork, but with this exception these terms, rod, rood, acre, and mile, are applied only to land. Land is measured by means of the chain which I mentioned in the last lesson, and which consists of 100 links. It is sixty-six feet long, *i.e.*, twenty-two yards. A square chain would therefore be twenty-two times twenty-two, *i.e.*, 484 square yards, and ten square chains would make 4,840 square yards, *i.e.*, one acre. As the chain is 100 links long, a square chain is 100 times

100, *i.e.*, 10,000 square links, and an acre, being ten square chains, is 100,000 square links. This system of measuring by the chain has been adopted by land measurers as being very much more convenient than any other method. The terms hide, plowland, carucate, and oxgang were formerly employed in this country in measuring land, and are to be found mentioned in Domesday book, as well as in some old charters and laws, but at the present day it is quite unsettled what they mean.

You will remember that in long measure only the length of things is taken into account, and that it is therefore called a measure of *one dimension*. In square measure we have seen that both length and breadth have to be taken into account, and it is therefore called a measure of *two dimensions*.

We now come to consider cubic or solid measure, which is used for the measurement of bodies in which we have to calculate, not only the length and breadth, but the thickness also, and which is therefore called a measure of *three dimensions*.

If you were to take a piece of soft clay, exactly a foot long, a foot wide, and a foot thick, and having all its sides square, it would represent a solid cubic foot, for such a figure is called a cube. Now if you were to mark off the inches on two of its opposite sides with your foot rule, you might cut it up into twelve square slices, each of which would be one inch thick, and a foot in length and breadth. Then if you were to take each of these slices and mark its surface into square inches, you might cut it up into little blocks, each of which would be an inch thick, an inch long, and an inch wide; in fact, a solid or cubic inch. And when you have thus cut up all the slices, you will find that you have 1,728 of these solid inches of clay. And this number 1,728 being found by multiplying twelve by twelve, and

that product again by twelve, is called the third power of twelve. And because it represents the number of solid inches in the cube, it is called the cube of twelve.

Now, you might mould all these solid inches of clay together into the shape of a loaf of bread, or a ball, or anything else. But still there would be precisely the same quantity of clay there was at first, *i.e.*, a cubic foot. So that when we speak of a cubic foot, inch, or yard of anything we merely mean just as much of the substance as would be contained in a cube a foot, an inch, or a yard each way, and the body alluded to may be any shape whatever.

Twenty-seven cubic feet make a cubic yard, which I think you will now fully understand, without any further explanation.

Remember that when you take the length only of a thing you use long measure. When you multiply the length and breadth, or any other two dimensions together, you get into square or superficial measure. When you multiply three dimensions together you get cubic or solid measure.

E. T. S.

WEIGHTS AND MEASURES (III.)

es'-ti-mate, *to value rightly*
 reg'-u-late, *to bring under a rule*
 pre-serve', *to keep*
 im-pe'-ri-al, *relating to the go-*
vernment of a country
 mul'-ti-ple, *that which contains*
any given quantity an even
number of times
 as-cer-tain', *to find out*
 ac'-cu-rate-ly, *exactly*
 re-put'-ed, *so-called, not real*

le'-gal, *lawful*
 de-fine', *to limit, to explain*
exactly
 sub'-se-quent, *following*
 en-join', *to order*
 lit'-er-al-ly, *strictly, to the very*
letter
 spe-cif'-ic grav'-i-ty, *the weight*
of any substance compared
with that of an equal quantity
of water

WE now come to the second class of things, whose quantities we may wish to estimate, *viz.*, those which it is found most convenient to measure by putting them into some vessel which we know beforehand will contain only a certain quantity. Such articles are wine, beer, corn, various kinds of fruit, &c. It was found necessary so far back as six hundred years ago to regulate the measures in use, so that when a person purchased a gallon of wine or a bushel of corn, he should know exactly how much he had a right to expect for his money, since what was called a gallon or a bushel sometimes contained more, and at others less, than it ought, and you may be sure it was oftener less than more. Accordingly we find that in the reign of Edward I. (1272—1299) it was ordered that a standard measure should be kept in every town, to agree with the King's measure. At the present time the standard gallon preserved at the Treasury, in London, contains 282 cubic inches. I have explained to you in a previous lesson exactly what a cubic inch is, and suppose, therefore, that you will have no difficulty in understanding what I mean when I say that the Standard Imperial gallon contains 282 cubic inches. Everyone in the country who makes use of the gallon measure, or the various parts of it, as gills, pints,

quarts, or the multiples of it, as pecks and bushels, must see that the measures which he uses agree with the standard, otherwise he is liable to be fined or imprisoned, and exposed as a cheat. The kind of measure we are considering is generally known as a measure of capacity, as before explained. By it, dry goods, such as corn, salt, &c., are measured. Hence, as far as these articles are concerned, it is sometimes called Dry Measure. Wine and beer are also measured in this way, and therefore, so far as these articles are concerned, it is known as Wine and Beer Measure.

The gallon being taken as the standard is divided into four parts or quarters, hence called quarts. The quart is divided into two parts called pints, and a quarter of a pint is called a gill. The multiples of the gallon are the peck, which contains two gallons, the bushel, which contains four pecks, and the quarter, which contains eight bushels.

Wine, beer, &c., are measured by the gill, pint, quart, and gallon. A barrel of beer contains thirty-six gallons; a half-barrel, which is called a kilderkin, contains eighteen, and a quarter of a barrel, called a firkin, contains nine gallons. A barrel and a half of beer, *i.e.*, fifty-four gallons, is called a hogshead. Two hogsheads, *i.e.*, three barrels, or one hundred and eight gallons, make a butt.

A hogshead of wine, however, is generally reckoned at sixty-three gallons, while two hogsheads, *i.e.*, one hundred and twenty-six gallons, make a pipe. Two pipes are called a tun.

When it is required to ascertain exactly what quantity of liquor a large vessel contains, it is done by measuring its depth and the area of its surface. Making proper allowance for the shape of the vessel in which the liquor is contained, its contents may be measured much more readily and accurately in this

manner than by any other. The process is called gauging, and the person who does it is called a gauger.

Wine and beer are frequently sold in bottles, called pints and quarts, but in general they contain only reputed pints and quarts, *i.e.*, considerably less than the legal standard. If you wish for an exact pint or quart bottle of anything, you must ask for Imperial measure. If any tradesman were then to give you less than the proper quantity, he would render himself liable to punishment.

But we must now pass on to consider the mode of estimating quantities of those things which have to be weighed with scales or steelyards or spring balances. By a law made in the reign of Henry III., 1266, it was decreed that the silver penny called the sterling should weigh thirty-two grains of wheat well dried and gathered out of the middle of the ear. This mode of estimating weight had been used for centuries previous to Henry III., but I believe this was the first law which defined the exact weight of the silver penny, or the pennyweight. Twenty of these silver pennies were to make one ounce, and twelve ounces a pound. A gallon of wine was to contain eight pounds, and eight gallons were to make a London bushel, which was the eighth part of a quarter. Other laws were passed in subsequent reigns regulating the weight of the pound, and enjoining the use of the same standard in all parts of the country. At present the lowest weight, the grain, is the same for Troy weight as for Avoirdupois, but whilst a pound in the former contains only 5,760 grains, a pound in the latter contains 7,000 grains.

There was an old saying—

A pint 's a pound
All the world round.

The first line of which was not strictly true, whilst

the second was very far from it. Under the present system the following is literally true :

A pint of pure water
Weighs a pound and a quarter.

i.e., twenty ounces of Avoirdupois weight. Of course, a pint of oil weighs less, because it is lighter than water, whilst a pint of treacle weighs more, because it is heavier, or, as we sometimes say, its specific gravity is greater.

It may be of great service to you to remember 'that a pint of pure water weighs a pound and a quarter,' and as there are eight pints in a gallon, a gallon will weigh ten pounds exactly. A cubic foot of water is six and a quarter gallons, and therefore weighs sixty-two and a half pounds. Hence you can very easily calculate the weight of water in a cistern or other vessel, if only you know how to measure its cubical contents.

All common goods are weighed by Avoirdupois weight, whose lowest denomination is the dram, of which sixteen go the ounce, and sixteen ounces to the pound. The pound is usually indicated by the letters lb. which is an abbreviation of the Latin *libra*, a pound. A hundredweight consists not of one hundred pounds, as you might suppose, but of one hundred and twelve; the twelve being added because originally it was used only for common goods, in which there was usually much waste. The abbreviation used for hundredweight is cwt., the first letter of which, as you are aware, is merely the Roman numeral for one hundred, and the wt. are the first and last letters of the word weight. A quarter of a hundredweight, I need scarcely tell you, is twenty-eight pounds. Twenty cwts. make a ton. Many things, such as coals, which were formerly sold by measure, must now, according to Act of Parliament, be sold by weight. Hops are sold

in pockets, which are merely large sacks, but as some pockets contain more and others less, they are always sold by weight. A ton of shipping is not a weight, but a measure of forty-two cubic feet holding twenty-four cwts. of sea-water.

Troy weight, which is now very rarely used, is said by some to have derived its name from the French *trois*, three, because of the three denominations it contains, dwt. (d., for Latin *denarius* a penny, and wt. for weight), ounce, and pound. Other persons, however, consider it to have been derived from Troyes in France. It differs from Avoirdupois weight in giving 5,760 grs. to the lb. instead of 7,000. The table is very easily remembered: twenty-four grains make one dwt., twenty dwts. make an ounce, and twelve ounces a pound.

Apothecaries employ other denominations than these in mixing drugs. They call twenty grs. a scruple, and three scruples a dram, which is the eighth part of an ounce. The lb., oz., and grain are the same as in Troy weight. In buying and selling medicines wholesale, however, Avoirdupois weight is always used.

For measuring liquids, apothecaries employ a glass vessel graduated at the side. A quantity of any liquid similar to that of a drop of water, they call a minim. Sixty of these minims make a fluid dram, eight fluid drams make a fluid ounce, and twenty fluid ounces make a pint. For water this is correct weight as well as measure, but not so with other liquids, since the quantity contained in a drop of liquid varies with its tenacity, or with the readiness with which its particles separate.

E. T. S.

THE NORTH AMERICAN INDIANS.

ad-vent'-u-rous, *bold, daring*
 ex-ro'-ne-ous, *founded on an error*
 sub-sist', *to live*
 im-mor-tal'-i-ty, *everlasting life*
 art'-i-fice, *a trick*
 dis-pos-sess'-ed, *deprived of*
 sim-i-lar'-i-ty, *likeness*
 e-lab'-or-ate-ly, *done with great*
 care
 glut'-ton-ous, *greedy*

ex-hib'-it, *to show*
 in-ces'-sant-ly, *without ceasing*
 pro-se-cu'-tion, *the carrying on*
 of any matter
 vin-dic'-tive, *fond of revenge*
 ex-tinc'-tion, *destruction*
 rem-nant, *that which remains*
 pli'-a-ble, *easily bent*
 pri-va'-tion, *want*
 de-lud'-ed, *cheated, deceived*

At the time when North America was discovered by Columbus the whole of it was peopled by various tribes, who were called by the adventurous voyagers, 'Indians,' from the belief that the continent they had found formed part of India; they expected to reach the latter country by sailing westward, having no idea that a vast continent lay in their way, of which they knew nothing. When they landed, therefore, they concluded they had reached some part of India, and the name which they gave to the people, though erroneous, has clung to them ever since.

The whole of the northern continent at that time was inhabited by various races, differing in many points, but who, from their copper-coloured skins, have been called 'Red men' or 'Red Indians.' These were divided into various tribes, each of which possessed a certain tract of country in which they ruled, and through this vast wilderness they roamed, knowing nothing of the arts of civilisation, subsisting entirely by the capture of wild animals, and living in rude huts or wigwams, or tents covered with skins.

In person they were tall and finely formed, with all their senses trained by constant exercise to the highest pitch. They possessed many great moral qualities. They were brave and skilled in war, would

bear any pain without flinching, were humane, truthful, and honest. They had no trace of idolatry, but all worshipped a supreme being, whom they called the Great Spirit, and they believed in an existence after death, but they had no higher idea of immortality than this, that their time would be spent in the happy hunting grounds, where without drawback they would enjoy all the pleasures of the chase. In habits they were temperate, never indulging in those gluttonous feasts in which many other tribes of savages delight. Their clothing was made of the skins of animals, which they tanned and prepared with great skill, ornamenting them tastefully.

To their friends they showed great kindness and care, but, on the other hand, their character was marked by many of the baleful qualities which savage man exhibits. Each tribe was incessantly engaged in war with one or other of its neighbours, and, in its prosecution, every artifice and treachery were practised. In the treatment of their enemies they were cruel, bloodthirsty, and vindictive. All the men shaved the head, with the exception of a lock which was allowed to remain on the back of the scalp. Every warrior, when he killed an enemy, stripped this portion of the scalp with the lock of the hair from the head of the victim, and he who could carry the greatest number of scalp locks at his girdle was considered the first warrior of his tribe. There were no laws by which the tribes were governed, but each individual was expected to redress his own wrongs, and the accomplishment of this was considered so important by the tribe, that the warrior who failed to wreak his cruel vengeance on his foe was scouted with contempt. The settlement of the white man on their shores brought, alas! many evils to these children of the forest. They were gradually dispossessed of their hunting grounds; but, worse

than this was the introduction amongst them of drunkenness. Poverty and disease followed, and from these, combined with the use of firearms against each other, they have gradually diminished until of the eight or ten millions which in Columbus's time was their estimated number, scarcely two millions exist at the present day, and their extinction is slowly approaching. The principal tribes are the Choctaws, the Maudans, the Blackfeet, the Sioux, the Pawnees, the Crows, the Apaches, the Ojibbeways, the Osages, the Comanches, the Shoshones, the Flatheads, the Arapahoes, and some others. These vary in language, dress, manners, and mode of constructing their dwellings, though they have a general similarity. Their arms were a lance, bow and arrows, and a tomahawk, or small hatchet, but now the remnants of the tribes all possess firearms.

The chief of a tribe generally wears a shirt and leggings of deerskin, prepared so as to be perfectly soft and pliable. The seams are sewn with thread of deer's sinews, and ornamented with small quills of the porcupine. Over this is worn a buffalo hide, with the hair inward, and outside is usually painted the battles in which the wearer has distinguished himself. His shirt and leggings are fringed with scalp locks, and when he goes to war he paints his face so as to present to his enemies the most imposing appearance possible. His head-dress is made of the skins of ermines, ornamented with eagles' feathers, and a shield of wood covered with hide completes his equipment. Deerskins form the dress of the females, and these are often beautifully and elaborately embroidered.

The tribes inhabiting the prairies, or level plains, frequented by vast herds of buffaloes, live on the flesh of these animals, which they also cut into strips and dry for winter consumption. The men consider

it their duty to fight, and to procure food for their families, but their wives, or squaws, do all the work about the camp, and their life is one of much privation and hardship.

The Sioux live in wigwams formed of long poles covered with skins sewn together. The Pawnees construct theirs of prairie-grass much in the form of our straw beehives. The Maudans make their wigwams of a circle of timber, over a hole excavated in the ground, beams and boughs are then placed across, and covered with earth in a dome-like form. Whatever the structure of their dwellings, a hole is always left in the top for the smoke to escape from the fire, which is placed in the centre.

In every tribe are certain doctors, or *medicine men*, who dress in the most frightful manner, so as to impress their patients and the tribe generally with their mysterious power, and they are looked upon with great awe, as able to do anything marvellous, such as to bring rain or cause it to stop, imposing by mere trickery on their deluded followers.

Some of the tribes, such as the Comanches, the Pawnees, and the Apaches, possess great numbers of horses, which they capture by means of the lasso from the immense droves that run wild on the prairies. They are skilful riders and fierce warriors, and their constant attacks on white settlers in the Far West have made it necessary for the United States Government to send a large body of troops to repel them. The Pawnees look very fierce in their war-dress, for they shave their heads and paint them with vermilion, adding a crest of horse hair, and a deer's tail dyed red.

Some of the tribes have a curious tradition of the deluge, believing that all the human race was drowned, with the exception of one man, who landed on a mountain from his canoe.

Sad it is to think, that while these savage tribes are fast disappearing before the white man, little is being done to lighten the darkness of their future. Some efforts are being made to teach them the way of salvation, but thousands are yearly sinking into the grave uncheered by a knowledge of Christianity.

W. J. S.

THE PRAIRIES.

un'-shorn, *not mown*
 prai'-rie, *a large grassy plain*
 di-lat'-ed, *stretched out*
 un-du-la'-tion, *a motion or appearance like that of waves*
 fluc'-tu-ate, *to flow backwards and forwards*
 Mex'-i-co, *a country in the west of North America*
 Tex'-as, *a country adjoining Mexico*
 lim'-pid, *clear*
 So-no'-ra, *a province of Mexico*
 sa-van'-nas, *grassy plains in South America*
 verd'-ant, *green*

con-stel-la'-tion, *a cluster of fixed stars*
 rank, *coarse*
 sac-ri-le'-gi-ous, *violating sacred things*
 sol'-i-tude, *a lonely place*
 dis-ci-plin'-ed, *trained, drilled*
 Pen-te'-li-cus, *a mountain of Greece celebrated for its white marble*
 Par'-the-non, *a temple in Athens, sacred to Minerva*
 bis'-on, *the wild ox*
 be-lea'-guer-ex, *a besieger*
 fu'-gi-tive, *a wanderer*
 hap'-ly, *perhaps*

THESE are the gardens of the desert, these
 The unshorn fields, boundless and beautiful,
 For which the speech of England has no name—
 The Prairies. I behold them for the first,
 And my heart swells, while the dilated sight
 Takes in the encircling vastness. Lo! they stretch
 In airy undulations, far away,
 As if the ocean, in his gentlest swell,
 Stood still, with all his rounded billows fixed,
 And motionless for ever. Motionless?
 No—they are all unchained again. The clouds

Sweep over with their shadows, and, beneath,
 The surface rolls and fluctuates to the eye;
 Dark hollows seem to glide along and chase
 The sunny ridges. Breezes of the South!
 Who toss the golden and the flame-like flowers,
 And pass the prairie-hawk that, poised on high,
 Flaps his broad wings, yet moves not—ye have
 played

•Among the palms of Mexico, and vines
 Of Texas, and have crisped the limpid brooks
 That from the fountains of Sonora glide
 Into the calm Pacific—have ye fanned
 A nobler or a lovelier scene than this?
 Man hath no part in all this glorious work:
 The hand that built the firmament hath heaved
 And smoothed these verdant swells, and sown their
 slopes

With herbage, planted them with island groves,
 And hedged them round with forests. Fitting floor
 For this magnificent sample of the sky—
 With flowers whose glory and whose multitude
 Rival the constellations! The great heavens
 Seem to stoop down upon the scene in love,—
 A nearer vault, and of a tenderer blue,
 Than that which bends above the eastern hills.

As o'er the verdant waste I guide my steed,
 Among the high rank grass that sweeps his sides
 The hollow beating of his footstep seems
 A sacrilegious sound. I think of those
 Upon whose rest he tramples. Are they here—
 The dead of other days?—and did the dust
 Of these fair solitudes once stir with life
 And burn with passion? Let the mighty mounds
 That overlook the rivers, or that rise
 In the dim forest crowded with old oaks,
 Answer. A race that long has passed away

Built them ;—a disciplined and populous race
Heaped, with long toil, the earth; while yet the
Greek

Was hewing the Pen telicus to forms
Of symmetry, and rearing on its rock
The glittering Parthenon. These ample fields
Nourished their harvests, here their herds were fed,
When haply by their stalls the bison lowed,
And bowed his manèd shoulder to the yoke.

All day this desert murmured with their toils,
Till twilight blushed, and lovers walked, and wooed
In a forgotten language, and old tunes,
From instruments of unremembered form,
Gave the soft winds a voice. The red man came—
The roaming hunter tribes, warlike and fierce,
And the mound-builders vanished from the earth.
The solitude of centuries untold

Has settled where they dwelt. The prairie wolf
Hunts in their meadows, and his fresh-dug den
Yawns by my path. The gopher mines the ground
Where stood their swarming cities. All is gone—
All—save the piles of earth that hold their bones—
The platforms where they worshipped unknown
gods—

The barriers which they builded from the soil
To keep the foe at bay—till o'er the walls
The wild beleaguers broke, and, one by one,
The strongholds of the plain were forced, and heaped
With corpses. The brown vultures of the wood
Flocked to the vast uncovered sepulchres,
And sat, unscared and silent, at their feast.
Haply some solitary fugitive,
Lurking in marsh and forest, till the sense
Of desolation and of fear became
Bitterer than death, yielded himself to die.
Man's better nature triumphed then. Kind words
Welcomed and soothed him; the rude conquerors

Seated the captive with their chiefs, he chose
 A bride among their maidens, and at length
 Seemed to forget,—yet ne'er forgot,—the wife
 Of his first love, and her sweet little ones,
 Butchered, amid their shrieks, with all his race.
 Thus change the forms of being. Thus arise
 Races of living things, glorious in strength,
 And perish, as the quickening breath of God
 Fills them, or is withdrawn. The red man, too,
 Has left the blooming wilds he ranged so long,
 And, nearer to the Rocky Mountains, sought
 A wilder hunting ground. The beaver builds
 No longer by these streams, but far away,
 On waters whose blue surface ne'er gave back
 The white man's face—among Missouri's springs,
 And pools whose issues swell the Oregon,
 He rears his little Venice. In these plains
 The bison feeds no more. Twice twenty leagues
 Beyond remotest smoke of hunter's camp,
 Roams the majestic brute, in herds that shake
 The earth with thundering steps—yet here I meet
 His ancient footprints stamped beside the pool.

Still this great solitude is quick with life.
 Myriads of insects, gaudy as the flowers
 They flutter over, gentle quadrupeds
 And birds, that scarce have learned the fear of man,
 Are here, and sliding reptiles of the ground,
 Startlingly beautiful. The graceful deer
 Bounds to the wood at my approach. The bee,
 A more adventurous colonist than man,
 With whom he came across the eastern deep,
 Fills the savannas with his murmurings,
 And hides his sweets, as in the golden age,
 Within the hollow oak. I listen long
 To his domestic hum, and think I hear
 The sound of that advancing multitude

Which soon shall fill these deserts. From the
ground

Comes up the laugh of children, the soft voice
Of maidens, and the sweet and solemn hymn
Of Sabbath worshippers. The low of herds
Blends with the rustling of the heavy grain
Over the dark-brown furrows. All at once
A fresher wind sweeps by, and breaks my dream,
And I am in the wilderness alone.

W. C. BRYANT.

CLOTHING.

ITS SOURCES AND MANUFACTURE.

se-lect', to choose
in-gen-u'-i-ty, skill in inventing
things
an-ti'-qui-ty, great age, old times
fi'-bres, small threads
at-tach'-ed, fastened
pow'-er loom, a loom worked by
steam or water
al-tern'-ate-ly, by turns

in-ter-lace'-ment, the passing of
threads over and under each
other in a regular manner
re-pre-sent-a'-tion, a picture, an
imitation
hor-i-zon'-tal, pointing towards
the horizon
hor-i'-zon, where the earth and
sky appear to meet

MAN is the only animal that has to provide a covering for the body. This is an advantage rather than otherwise. First, because it enables him to select the best kind of material, to use his ingenuity in converting the raw material into the finished garment, and his taste in arranging and fastening the various articles of dress. Second, because it enables him to adapt his covering to the various climates of one country, and the different climates of the various localities in which he may be placed.

Animals dwell, for the most part, within certain limits of a country, and their covering adapts itself

to the changes of season,—the fur, hair, or feathers thickening on the approach of winter, and thinning again as the summer advances. The summer dress of the animals found in the northern parts of Europe would be quite unfit for the climate of the tropics. But as civilized man does not of necessity confine himself to any one locality, it is an immense advantage to him to be left to provide his own covering.

The sources of man's clothing are found in both the animal and vegetable world. At the present time the chief materials used are wool, silk, and fur, three animal substances; and cotton, flax, and hemp, three vegetable substances, of which the two former, however, are the most commonly used. But these substances were not always used in this country. The ancient Britons clothed themselves in the skins of the animals which they caught in the chase. Woollen garments were not much worn until after the Norman conquest. The wool was spun by the unmarried daughters of the nobles, and hence the word *spinster*, or maiden. The use of silk as a material for clothing is of great antiquity, but it was very costly; so much so, that we read in Roman history that the Emperor Aurelian, who died in the year A.D. 275, refused the Empress a silk dress on account of its costliness.

Silk was first used in England about the year 1455, when a company was formed called Silk Winners, most probably these were workers in silk. It was not, however, until 1685 that the manufacture of silk was established in London, when many French refugees, who came to this country after the revocation of the Edict of Nantes, settled in Spital-fields. The manufacture of silken goods is now carried on in several parts of England, and the

quantity of raw silk used is very great. In 1868 as much as 7,036,177 lbs. were imported.

The fibres of the flax plant have been employed as a material for clothing from the very earliest times. It was in common use among the Egyptians in the time of the Pharaohs of the Bible, and among the paintings on the Egyptian tombs may be seen many representations of the flax plant, and the different stages in the manufacture of linen.

Whether the raw material used for clothing be silk, or wool, or flax, or cotton, it has to undergo several operations before it can be made into a garment. The most important of these are spinning and weaving. We will now describe these operations as they refer to cotton.

Cotton is the downy covering of the seeds of the cotton plant, and is contained in the seed vessel. When the seeds are ripe the pod opens, and the cotton is gathered by hand, an operation on which great care is bestowed. It is gathered as soon after the pod bursts as possible, and always in dry weather. The seeds are now separated from the cotton by a simple machine, called a gin. When freed from the seeds it is pressed into bags or bales, each of which when full weighs from 330 to 350 lbs.

When bought by the manufacturer the cotton is mixed with dust, and it has therefore to undergo the operation of cleaning, which is performed by a machine called a willow. In this state the fibres of the cotton are placed in all directions, but before the cotton can be spun into a thread they must all be laid one way. This is accomplished by first forming the cotton into a continuous sheet, called a *laze*, in which state it resembles a sheet of wadding, and then by a process called *carding*. The carding engine collects the fibres into a fine sheet, and then

forms it into a narrow flattish band, called a *sliver*. The fibres are not even now in a fit state to be spun, and so eight or ten of these slivers are united into one by the drawing machine. This process is repeated several times, and the cotton is said to be drawing No. 1, 2, 3, and so on, the sliver being increased in length each time the cotton is drawn. This process is repeated again and again, under the name of *stubbing* and *roving*, the cotton being drawn out into longer and thinner threads at each operation. When the *roving* is brought down to its proper fineness, it is next *spun*, that is, the fibres are twisted and made into a strong thread. It is now called *yarn*. This process is a very important one, and used formerly to be performed by hand, by what was called the spinning wheel. Now, however, it is performed by a beautiful machine, called the spinning mule or spinning Jenny. This machine was invented by James Hargreaves, in the year 1764. It was afterwards improved by Richard Arkwright, in 1769, and perfected by Samuel Crompton, in 1799. Further improvements have been made in these spinning machines, and the self-acting spinning mule of the present day may safely be considered one of the wonders of the world. That such is the case will be seen by a few facts relating to the spinning of very fine yarns.

The fineness of the thread is expressed by numbers, as No. 40, No. 60, and so on, up to 700, or even 1,000. These figures represent the number of hanks to the pound, the hank or lea, as it is termed, always containing 840 yards. At the present day linen yarn of No. 700 is sometimes spun. Now 700 leas of 840 yards each will equal 588,000 yards to a pound, or rather more than *three hundred and forty-six miles*. Yarn of this degree of fineness has been sold at 560 shillings per lb., or 35 shillings per oz.,

or seven times the value of silver at 5s. per oz. The yarn having been spun is next woven.

Weaving is the art of making cloth by the interlacement of threads. It has been practised from the earliest times, for representations of hand-loom for weaving are found in the tombs of the ancient Egyptians, constructed on the same principle as those in use at the present day.

If a piece of any plain woven material be examined, it will be found to consist of two sets of threads, the first running the whole length of the cloth parallel to each other, and forming what is called the *warp*; the second passing across the warp at right angles in the direction of the width of the cloth, and forming the *weft*. If the threads which form the weft are examined, they will be found to pass alternately over and under those of the warp. The thread which forms the weft is a continuous one, being doubled back at the edge of the cloth, and as it returns passing *over* those threads it passed *under* before, and under those it previously passed over. Indeed, the arrangement of the threads is similar to that which is produced in darning.

The first process in weaving is to fix the threads of the warp. The length and width of the cloth having been determined, the threads are wound upon a roller, and then laid parallel by an instrument resembling a comb. When a sufficient length of warp is wound on the roller, the unattached ends are fastened to another roller, called the *cloth beam*. Before this is done, however, each alternate thread is passed through a loop in an instrument called a *heddle*. In weaving all plain cloths two heddles are used, each consisting of two horizontal sticks placed across the warp, one a small distance above, and the other below. These two sticks are connected together by a number of thin pieces of twine, which pass per-

pendicularly through the threads of the warp. In the middle of each piece of twine a loop is made, and through this the thread of the warp is passed. If the heddles are called one and two, and the threads of the warp be considered as representing the odd and even numbers, then heddle number one will contain the threads one, three, five, seven, nine, &c., and heddle number two have threads two, four, six, eight, ten, &c.

This process having been accomplished, the ends of all the threads are fastened to the cloth roller. The heddles are so suspended that they may be raised or depressed about two inches by means of a treadle, moved by the foot of the weaver in hand looms, or by a piece of machinery in power looms. The two heddles are connected together by a cord passing over a pulley, so that when one is depressed the other is raised; and when this is the case half the threads of the warp will be pulled up by one heddle, and the alternate threads depressed by the other, leaving a space between them, and through this space, which is called the *shed*, the thread of the weft is passed. As the position of the heddles is reversed, the threads of the weft pass over and under the alternate threads, and so they are firmly interlaced. In order to pass the thread of the weft easily from side to side, it is wound on a small piece of wood, called a *shuttle*, which is thrown across the warp, the thread unwinding as it proceeds, and each thread of the weft being pushed up to the last by an instrument called a *batten*. As the cloth is woven it is wound on the cloth roller, and then taken to the finisher, bleacher, or printer, as the case may be.

The weaving of linen, hempen, and silk goods is performed in a similar manner.

J. H.

THE BEAVER.

ap-pear'-ance, *look*
 ex-press'-ing, *uttering, represent-*
ing
 neigh'-bour-hood, *places near*
 in-hab'-it, *to dwell in*
 sol'-i-tar-y, *living alone*
 hor-i-zon'-tal-ly, *pointing towards*
the horizon
 hor-i'-zon, *where the earth and*
sky appear to meet

con-di'-tion, *state, rank*
 do-mes'-ti-cat-ed, *tamed, made*
accustomed to a house
 pro-jec'-tion, *a jutting out*
 de-pres'-sion, *a pressing down*
 suf-fi'-cient, *enough*
 in-ter-lac'-ed, *plaited together in*
and out
 in-ter-fere', *to come between, to*
meddle with another's business

'THE very person I wanted to see,' said a steady old beaver to a neighbour of his, who happened to pass his house.

'Here I am, friend,' was the reply. 'What are your wishes?'

'Will you oblige me,' said the old beaver, 'by writing a short account of yourself, and letting me send it to some girls in England, who are anxious to know what sort of a creature you are?'

'With all my heart,' replied the frisky young gentleman. 'But where shall I begin?'

'With your size and appearance, of course,' answered the steady old man. 'Then, where you live, what you eat, and how you are able to get about and manage your affairs in general.'

This seemed to please the young beaver very much, and after expressing his pleasure in being of any use to the girls of England, he went on to say:

'I belong to a race of gnawers who always take up their abode in the neighbourhood of rivers and lakes, and who inhabit the solitary parts of North America, Siberia, and Norway, and are found also on the banks of the Rhone, the Danube, the Weser, and a few other rivers of Europe.'

'Respecting our appearance, I may just say that when full grown we are about three feet long. We

have rather short and rounded heads ; our bodies are rather thick, having at the end a flattened oval tail, covered with scales, and placed horizontally to the body. On each foot we have five toes ; those of the hinder being webbed.

‘ We Canadian beavers are of a uniform reddish brown, but some of our race are found of a flaxen colour, some few white, and others black.

‘ As to our food. The whole of our family are very fond of the fresh bark of trees, and other hard vegetable substances which we obtain in the woods. When, however, we are taken care of by man and domesticated, as they call it, we have been known to eat some kinds of fish, such as the eel and the mullet. The mention of our food leads me to say a few words about our teeth. Most animals have three kinds of teeth, cutting teeth, tearing teeth, and grinding teeth. We have but two kinds, namely, cutters and grinders. Of the former we have two in each jaw, placed exactly in the centre. Of the grinders we have four on each side of both upper and lower jaw, sixteen in all ; so you see we have twenty teeth. The grinding teeth have flat crowns, with grooves in them. The projections of the upper teeth fit into the depressions of the lower, and as we can move our jaws from side to side, these teeth form excellent grindstones, between which we crush the hard substances upon which we feed.

‘ It is with the cutting teeth that we supply ourselves with food, gnawing off the bark, and even cutting down the trees themselves when we want them to build with. The continual gnawing causes our teeth to wear away, but they grow from the roots as fast as the tips are worn, so that we have always a good set of these cutters, whatever may be our age. You see, then, that we never re-

quire the aid of a dentist to supply us with false teeth.

‘As it may interest the English girls to know a little about the way in which we live, I will let them into a few family secrets. In the summer we roam about in the neighbourhood of the rivers, digging for ourselves large holes in the banks. Into these burrows, as they are called, we go when any of our enemies make their appearance. On the approach of winter we make up small parties of two or three families and build huts for ourselves; sometimes on the banks, and sometimes in the middle of the rivers. As the winters are very cold in North America, and the shallow streams are frozen to the bottom, we always choose the deepest pools or rivers, and having made up our minds as to the exact spot where we intend building, we all go up the stream, and commence cutting down small trees which grow on the banks. These fall into the river, and are carried down by the stream. If we are tired we can have a ride on them as they go along.

‘When the trees have reached the place where the house is to be built, we commence the work at once, if there is sufficient depth of water. When this is not the case, we set about forming a wall, which is called a dam to maintain the water at a properly equable height. This dam is formed of the branches of trees interlaced with each other, the spaces between being filled up with stones and mud and plastered over with a thick coat of earth.

‘We commence building the dam from the bottom. This is always the thickest part, sometimes as much as ten feet thick. When the dam is finished we form ourselves into smaller parties, and commence building our huts against it. We always build in the night.

‘Each hut has two stories—one above the water,

which is our living room, and this is always dry ; the other under the water, which is our store-room. The entrance to the rooms is always under water, to enable us to keep out our enemies. Should we be attacked, we make off for the burrows, which we made in the banks of the river during the summer.

‘I am sorry to tell you that one of our bitterest foes is man, who hunts us for the sake of our skins. He chooses the coldest time of the year for this purpose, because he says our fur is in the best condition then. We wish he would let us alone, as we never interfere with anybody ; and we like the maxim, “Live and let live.” I am, however, happy to say that we are not so much sought after as we used to be, since gentlemen have left off wearing beaver hats.’

J. H.

DRAINAGE.

diffus'-ed, poured out, spread
in'-un-date, to overflow
in-dis-pen'-sa-ble, that cannot be
done without, necessary
in-ad'-e-quate, not equal to the
purpose
per-ni'-cious, destructive
an-ti'-qui-ty, old times
con-tam'-in-ate, to defile, to
pollute
re-claim-a'-tion, recovery, improve-
ment

trib'-u-tar-ies, streams that flow
into others, those that pay
tribute
re'-ser-voir, a place where water,
&c. is stored
im-per'-vi-ous, that cannot be
passed through
a-vid'-i-ty, greediness
sim-ul-ta'-ne-ous-ly, happening at
the same time
me-tro'-pol-is, the chief city of a
country

MAN could not exist without water. We find it, therefore, plentifully and widely diffused over the surface of the globe, although there are many spots where, over an immense extent of land, not a drop is to be found. And not only does water flow freely over the surface of the earth, but it percolates through

the soil in various ways, and accumulates in natural cavities, or flows through deep subterranean channels out of sight, appearing again at the surface in the shape of springs, forming lakes, or running to the ocean through the valleys in the shape of rivers. Again, water is absorbed from the earth by the heat of the sun, and after forming those beautiful clouds above us, and sailing about in a never-ending variety of shapes, falls again upon the earth in refreshing showers, or in inundating floods. Water covers two-thirds of the surface of the globe, and in many places, dashing against the shores of those countries which lie upon the borders of the ocean, washes away the barrier and overflows large districts, making them uninhabitable for man, by forming fens or marshes. Like many other things with which man has to do, water is indispensable to his comfort and even life; it is an excellent servant, but a very bad master. It is therefore necessary on all lands which man would inhabit or cultivate, to regulate by all possible means the supply and the sojourn of the water, from whatever source it may come. To be without water entirely, or to have an inadequate supply, is indeed unfortunate, but it is as requisite to remove from the ground any waters whose stay might be pernicious, and to see that the discharge of the superabundant waters is adequately provided for. This removing of waters, so as to make an extent of country hitherto flooded capable of cultivation, or to make a damp soil just dry enough either for agricultural pursuits, or for human habitation, is called the art of drainage. The serious attention of man in all ages has been given to this art. The Egyptians, Assyrians, Romans, and other nations of antiquity, have left behind them, both in the curious works found amid the ruins of their cities, and also in the written books of their various authors, numerous evi-

dences of their attention having been seriously turned to this subject. During the middle ages the science was forgotten, or neglected, and the greatest drainage works of modern times are those carried out by the Dutch engineers in Holland, and in our own country by the drainage of the Bedford Level, and various other marshy swamps and morasses, as the Bog of Allen in Ireland. Besides the reclamation of these low-lying districts, great improvements have been made in the clearance of injurious waters from upland districts. In addition to the drainage of these large tracts of land, we have also to notice the works connected with our large towns, distinguished from those of rural districts by the name of urban drainage. We shall, however, turn our attention for a short time to the art as carried out in various districts, first, for the improvement of the land for the purpose of cultivation; secondly, the reclaiming of large tracts hitherto useless for agricultural purposes.

The natural drainage of a country is carried on by rivers and their tributaries. These carry down to the mighty reservoir of the ocean the surplus water from the springs, or supply from the rain-fall which does not find its way into the interior of the earth. Many cultivated lands lie upon the banks of these streams, the waters of which percolate through their banks, and keep the soil constantly moist. Rain, at the same time, falls upon the surface, the greater part of which finds its way into the soil, and if this soil is stiff, and nearly impervious to moisture, the water will lie in all its hollows and depressions and stagnate, injuring the roots and tender fibres of all plants growing upon its surface which are not aquatic. To remove this surplus moisture, and to cause the rain-water, which is necessary to the growth of plants owing to its

fertilizing influences, to circulate freely through the soil, are the great objects of drainage. This is accomplished either by means of channels cut as ditches in the soil, or by means of covered sub-ways formed of tiles or drain-pipes. The latter plan is the one most generally adopted in this country. These pipes are laid at certain depths, and certain distances, varying with the nature of the soil, and the amount of rain falling in the neighbourhood. The depth of the drain is regulated by the place where the outfall is to be, and by the depth the plough will enter the soil. The deeper the drain, the more costly the operation will be; but as more land will be brought into use by a deep drain than a shallow one, the former is less expensive in the end. The distance of the drains from each other is regulated by the quantity of rain falling, and by the quantity which the nature of the soil allows to soak into the earth. The drains are placed right down the slope of the field, so that the water may go the quickest and nearest way out when it once gets into them. Generally they are made about four feet deep and from five to ten yards apart. The outlets of the drains are generally in the ditch which bounds the field, and in order that the soil may not be carried away from the side of the ditch a wooden or stone trough is laid to discharge the water; and to prevent whatever sand or earth may be brought down from choking the mouth of the outlet by forming a bank, the mouth is brought at an obtuse angle to the side of the ditch. The drains, of whatever description, should be made as far as possible from the roots of trees or shrubs, which by their avidity for water, would soon find their way in, and choke them up.

In the drainage of lowland districts forming fens and bogs, where the surface is below the level of the surrounding ocean, as much water as possible is got

rid of by sloping ditches ; but generally the great body of the water has to be pumped up from the lower level to an artificial higher one, so that an outlet may be made higher than the surface of the ocean into which it is to be discharged.

Very often these lakes, fens, or morasses, are formed by the water from a higher level finding its way into them ; and in this case it is sufficient to surround the upland country by a deep and wide conduit, into which the water falls, and is conducted to its outfall without reaching the lower level.

In some countries, such as Switzerland, large tracts of country once covered with water have been rendered highly productive, by boring channels through the solid rock, and thus draining off the water. And in other countries, as in Holland, and our own counties of Cambridgeshire, Lincolnshire, Norfolk, &c., the reclaimed land is only kept from inundation by careful attention to, and strict preservation of, the works originally erected.

In the drainage of towns, two points have to be considered. First, whether the rain-fall or surface waters are to be carried off simultaneously with the refuse of the town. Secondly, the nature of the soil upon which the town is situated, *i.e.*, whether there are any surface springs or water-courses, the removal of the surplus waters of which must be energetically provided for. In addition to these considerations, the nature, size, and number of drains must be determined by the position of the town, whether it is situated on a level soil or on a slope, and whether the streets are paved, or merely ordinary soil ; and the number of open spaces existing in the town. All these points must be considered, because the larger the paved area, and the stiffer the nature of the ordinary soil, the greater must be the provision for carrying off the rain or surface waters.

The name sewer has come to be applied to any 'artificial channel for the removal of surface, subsoil, or house waters,' although originally the name was only applied to banks erected by the sides of rivers, to preserve the low lands from the effects of inundation. Until a very recent period, the sewers of London were used exclusively for carrying off surface, subsoil, or ordinary house waters, and anyone discharging filth of any kind into the sewers was punished by a fine. But now the modern use of these subterranean channels is of infinitely more importance than the original one, and the authorities are obliged to regulate the discharge of all the refuse, of whatever kind, from the town. A great evil has arisen from this; viz., that the natural water-courses of the country into which the sewage is discharged have become contaminated, and enormous quantities of fertilizing matter have been wasted. But of late years the attention of the authorities has been turned to this; and the result has been a considerable improvement in both matters, though much remains to be done. The magnificent system of sewers constructed lately in London, at a cost of over 4,000,000*l.*, conducts the whole of the sewage of the metropolis to several outlets at Crossnep Point and Barking, where, by the arrangement of powerful machinery, it is pumped into the river at high tide, and by the ebb tide carried out to sea. Thus the first evil of contaminating the Thames, and other water-courses, is avoided.

C. J. C.

THE OCEAN.

rap'-ture, *delight*
 in-trude', *to go where one is not*
wanted
 in'-ter-view, *a meeting*
 u'-ni-verse, *all creation*
 Traf-al-gar', *a promontory in*
Spain, at the entrance of the
Straits of Gibraltar
 az'-ure, *a deep blue*

arm'-a-ments, *armed ships, can-*
nons, &c.
 le-vi'-a-than, *a huge fabulous*
animal
 arb'-i-ter, *a judge, an umpire*
 Ar-ma'-da, *a powerful fleet which*
Philip, King of Spain, sent to
invade England in the reign of
Queen Elizabeth

THERE is a pleasure in the pathless woods,
 There is a rapture on the lonely shore,
 There is society where none intrudes,
 By the deep sea, and music in its roar !
 I love not man the less, but nature more,
 From these our interviews, in which I steal
 From all I may be, or have been before,
 To mingle with the universe, and feel
 What I can ne'er express, yet cannot all conceal.

Roll on, thou deep and dark blue ocean, roll !
 Ten thousand fleets sweep over thee in vain ;
 Man marks the earth with ruin—his control
 Stops with the shore ;—upon the watery plain
 The wrecks are all thy deed, nor doth remain
 A shadow of man's ravage, save his own,
 When, for a moment, like a drop of rain,
 He sinks into thy depths with bubbling groan,
 Without a grave, unknell'd, uncoffin'd, and
 unknown.

His steps are not upon thy paths,—thy fields
 Are not a spoil for him,—thou dost arise
 And shake him from thee ; the vile strength he
 wields
 For earth's destruction thou dost all despise,
 Spurning him from thy bosom to the skies,

And send'st him shivering in thy playful spray,
And howling to his gods, where haply lies
His petty hope in some near port or bay,
And dashest him again to earth ;—there let him
lay.¹

The armaments which thunder-strike the walls
Of rock-built cities, bidding nations quake,
And monarchs tremble in their capitals ;
The oak leviathans, whose huge ribs make
Their clay creator the vain title take
Of lord of thee, and arbiter of war—
These are thy toys, and as the snowy flake,
They melt into thy yeast of waves, which mar
Alike the Armada's pride, or spoils of Trafalgar.

Thy shores are empires, changed in all save thee :
Assyria, Greece, Rome, Carthage, what are they ?
Thy waters wasted them while they were free,
And many a tyrant since ; their shores obey
The stranger, slave, or savage ; their decay
Has dried up realms to deserts :—not so thou ;—
Unchangeable save to thy wild waves' play,
Time writes no wrinkle on thine azure brow,
Such as creation's dawn beheld, thou rollest now !

Thou glorious mirror, where the Almighty's form
Glasses itself in tempests ; in all time,—
Calm or convulsed—in breeze, or gale, or storm,
Icing the pole, or in the torrid clime
Dark-heaving ;—boundless, endless, and sublime,
The image of eternity—the throne
Of the Invisible ; even from out thy slime
The monsters of the deep are made ; each zone
Obeys thee ; thou goest forth, dread, fathomless,
alone.

¹ The poet uses this word for the purpose of rhyme. Correctly, it is 'lie.'

And I have loved thee, Ocean ! and my joy
 Of youthful sports was on thy breast to be
 Borne, like thy bubbles, onward : from a boy
 I wanton'd with thy breakers,—they to me
 Were a delight ; and if the freshening sea
 Made them a terror, 'twas a pleasing fear,
 For I was as it were a child of thee,
 And trusted to thy billows far and near,
 And laid my hand upon thy mane, as I do here.
 LORD BYRON.

THE BAROMETER AND THERMOMETER.

bar-o'-me-ter, *an instrument for measuring the weight of the atmosphere*

ther-mo'-me-ter, *an instrument for measuring heat*
 per-suade', *to influence by argument or entreaty*
 rap'id-ly, *swiftly*

cent'-i-grade thermometer, *one so graduated that freezing point is 0° and boiling point 100°*
 de-pend', *to rely on*
 mer-cu-ry, *another name for quicksilver*
 con-tin'-u-al-ly, *without ceasing*
 in-con-ve'-ni-ent, *unavoidable, unfit*

WE saw in a former lesson that the earth was surrounded by a covering of air from fifty to one hundred miles thick. Suppose you take a basin of water, into which you put one end of a glass tube or a stout wheat straw. The water inside and outside the tube is covered by air which presses upon it just as the water presses upon the bottom of the basin. Put your mouth to the upper end of the tube and gently suck or draw off the air, as you have, perhaps, done many a time in drinking water to which you could not put your mouth. You see that as you draw off the air the water *rises* in the tube, and the more you draw off the air the higher it rises. Remove your mouth ; the water falls back again, and the tube is filled with air as before.

How is this? Why did the water rise in the tube as you drew away the air, and why did it fall when you let the air into the tube again? The water could not rise of itself; something drove it up. We said that the air in the tube pressed upon the water as well as the air outside. When you drew off the air out of the tube you removed that pressure, and then there was nothing to prevent the air outside from driving the water up the tube. When you removed your mouth the air again pressed upon the water in the tube, and it was driven down.

How high could we get the water to rise in this way, and how long a column will the air hold up? Not higher than thirty-two feet. But why not? We shall presently see.

Put quicksilver instead of water into your basin, and take a glass tube a yard long and closed at one end as a bottle is closed. Now fill your tube full of quicksilver, close the open end with your finger, turn it bottom upwards, and put the end stopped with your finger into the basin of quicksilver. Now remove your finger. What happens? You see some of the quicksilver runs out into the basin and presently stops. See the height of the column in the tube! It is not thirty-six but thirty inches high, and you cannot easily persuade it to rise any higher. But why should it stop at thirty inches? Why does it not sink lower? The air pressing upon the quicksilver outside the tube is just able to keep it up to that height and no higher. But why is the air not able to hold up as long a column of quicksilver as of water? Simply because quicksilver is very much heavier (about thirteen times) than water. Thus we get a column of quicksilver thirty inches high, or a column of water thirty-two feet high, just balancing a column of air of the *same size* more than fifty miles high; therefore these columns, of such different

lengths, must be of the *same weight*. But how heavy is each of these columns? That depends upon the size of the column as well as the height. Suppose each of them be an inch square, then the column of quicksilver would be exactly thirty cubic inches, and would weigh 15lbs., which, you will at once see, must also be the weight of the column of water and air. Thus we learn that a column of air of 15lbs. weight is pressing upon every square inch of the earth's surface at *the level of the sea*.

Let us now take our basin and tube of quicksilver up yonder high hill. Now we are half way. See, the quicksilver stands at twenty-nine inches. A little higher and it is only twenty-eight inches high, and the higher we ascend the more the quicksilver sinks in the tube. How is this? You are right; we have not so much air above us as when we started, for we have left some below, and the shorter column of air can only balance the shorter column of mercury. It has been found that about three miles high the column of quicksilver is only fifteen inches high, and at 20,000 feet, or about four miles high, only twelve inches. What do these things tell us? That at three miles high we have only half the air above us, and at four miles high still less. By our quicksilver tube, then, we can measure the heights of mountains.

But this is not all. If you watch carefully the quicksilver at the bottom of the hill or at the sea level, you will see that its height is continually changing as the weather changes, being sometimes a very little higher and sometimes a little lower. What is the cause of this? It is explained by the fact that air containing vapour is lighter than dry air. Now the kind of air over a place is continually changing. When the air is dry or heavy the quicksilver rises, and when it is damp the quick-

silver falls; so by means of the quicksilver tube we may be able to foretell when the weather is likely to change.

When such a tube is properly fitted up in a case, the rising and falling of the quicksilver is made to turn a little wheel which moves a hand round a dial, somewhat like the face of a clock. Since it measures the pressure of the air it is called a *barometer*, and because it foretells changes of weather it is called a *weather-glass*, which you perhaps have in your own house.

THERMOMETER.

On this subject we may begin with the statement that the thermometer is a better test than the hand as to whether one substance is hotter or colder than another. Let us consider this matter a little.

You know that air, water, and iron expand when heated, as indeed do nearly all other substances.

Suppose we take a phial bottle, or, better still, an oil flask which has a round bottom and a long narrow neck, and half fill it with cold water. The upper half you know will be full of air. Now stop the bottle with a cork through which you have passed as small a glass tube as you can get, and a foot or eighteen inches long. Let one end of the tube go to the bottom of the water. Make the cork airtight so that no air can get out of the bottle. Some of the water will rise in the tube.

Now hold the bottle between your finger and thumb *above* the water. You see the water rises higher in the tube. Remove your finger and thumb, and it quickly sinks. Breathe on that part of the glass, and the water in the tube rises as before. Clasp your warm hand firmly round the air part of the bottle, and the water will rise very rapidly, and at last flow over. Take your hand away, and the

water soon sinks. Once more: hold the bottle before the fire or put it into warm water, the water rises. Now take it out of doors or put it into cold water, and it sinks as before.

Why is this? When you hold the air part of the bottle, breathe on it, or put it before the fire, the bottle gets warm and warms the air inside. This air being expanded and not being able to get out, drives the water a little way down the bottle but a great way up the tube. This is an air thermometer, which measures very small quantities of heat remarkably well, but would not do for large quantities, which would require a very long, inconvenient tube.

Would water do? Let us see. Fill your bottle full of water and cork it as before. Hold it in your hand as you did the air bottle. You see the water does not rise in the tube as it did in the air thermometer, so that it is not such a good measure of small quantities of heat. Again, if we heat water very much it will become vapour, and burst the bottle, and if it become very cold it will freeze into a solid. Water, then, will not do for a heat measurer.

But quicksilver, which is a liquid metal, may be made very hot without becoming vapour, and very cold indeed without freezing, and a small amount of heat will make it expand; therefore quicksilver is generally used for thermometers.

To make such a thermometer we take a small glass tube with a hollow ball at one end and open at the other. Into this ball we must put quicksilver. But how are we to get quicksilver down such a narrow tube? In this way. Heat the ball and *nearly all* the air will be driven out; then if we put the end of the tube into a basin of quicksilver the air outside will drive the quicksilver into the ball. Now let us heat the ball again till the quicksilver fills the tube, driving out *all* the air;

then stop the end of the tube by melting it, so that when the quicksilver sinks no air can get in, and an empty space be left at the top.

The next thing to be done is to fit it into a frame and divide it into a scale of equal parts which are marked on the frame. This is a very important part of the business. First, we put the thermometer into melting ice, and we find the quicksilver sinks to a certain point at which it will stand till all the ice is melted. This point, called the *freezing-point*, is marked on the frame. When the quicksilver reaches this point water begins to freeze. Next, the thermometer is put into boiling water, and the quicksilver rises to a certain point and will not go any higher. This is called the *boiling-point*. Now we divide the space between the freezing and the boiling point into any number of equal parts we please, making the same divisions above and below.

In the common thermometer, called Fahrenheit's, this space, as you may see, is divided into 180 parts or degrees—freezing-point being at 32 and boiling-point at 212 degrees. A man named Celsius divided the space into 100 degrees, calling the freezing-point 0 and the boiling-point 100; therefore this is called the *centigrade* thermometer. And you will easily see that as 100 degrees of the centigrade are equal to 180 of the common thermometer, a degree of the former must be larger than one of the latter.

H. T.

SOAP AND SODA.

hu'-man-i-sing, <i>softening, civil- ising</i>	con-vert', <i>to change</i>
in'-flu-ence, <i>moving, or directing,</i> <i>power</i>	dis-solv'-ed, <i>melted</i>
in-gre'-di-ents, <i>the parts of which a substance is composed</i>	pe-cu'-li-ar, <i>singular, particular</i>
ex-ten'-sive, <i>wide, large</i>	ad-di'-tion, <i>the act of adding</i>
so-lu'-tion, <i>a liquid containing some other substance dissolved in it</i>	re-quir'-ed, <i>needed</i>
	suf-fi'-cient, <i>enough</i>
	quan'-ti-ty, <i>a portion, part, a weight or measure</i>
	sol'-u-ble, <i>that may be dis- solved</i>

AN old proverb, in which there is a great deal of truth, declares that 'Cleanliness is next to Godliness,' and certainly we should not expect to find any person possessing the latter indulging in dirty, filthy habits. Cleanliness is a quality not possessed or practised by heathen nations, and it is far from pleasant to read the accounts which travellers give of the filthiness which marks the persons and dwellings of the natives of heathen countries. Apart from its humanising influence, cleanliness is important with regard to health. No person who neglects to practise cleanly habits can possibly enjoy good, sound health; and our young readers should remember that unless the skin is kept clean, and the minute pores with which it is filled free from dirt, the health is sure to suffer in some way.

The two articles named at the head of this lesson are of immense service in the work of cleansing, and as it will fall to the lot of most, perhaps all, girls to use both of them in after life, they will be interested in knowing something about them. Soda being one of the ingredients of which soap is made, we will begin with it first.

It must be remembered that all soaps are made of some kind of fat or oil, and alkali, for without the

latter the fat would not be changed into soap. Soda is an alkali, and the abundance and cheapness with which it can be made have brought it into extensive use.

There are two different substances sold under the name of Soda. One is known by chemists as the bicarbonate of soda, and is that which is used in making effervescing powders, such as sherbet, lemon kali, &c.; the other, which is used in making soap, is much stronger in taste and action than that just mentioned. It is called by chemists the carbonate of soda, and consists of carbonic acid, oxygen gas, and the metal sodium. It is obtained from common salt, which is not a simple substance, as you may have supposed, but a compound of chlorine gas with sodium. The salt is heated with sulphuric acid, carbon, and lime, by a rather complex process, until, besides several other substances, the carbonate of soda is obtained. This is the common washing or caustic soda of the shops.

In order to make soap, the caustic soda is dissolved in water, and forms what is called ley. The fat or grease is then placed in a copper and melted, and a quantity of the ley added, which unites with the grease and forms a thick, sticky liquid; a solution of salt is then put in, which causes the water to separate. This is pumped away and more ley added, until the whole of the grease is converted into soap.

If mottled soap is required, a solution of iron is mixed with some strong ley and poured into the soap, through which it slowly passes, giving it a dark mottled appearance.

Yellow soap is made by adding resin to the mass in the copper. This is acted on by the alkali in the same manner as the fat, but it gives the soap its yellow colour and its peculiar smell and taste, and

also causes it to form a lather more easily than other soaps.

White or curd soap is made in the same manner, only the fat is of the best and whitest kind. Scented soap is made of this white soap, with the addition of the peculiar scents required, and some matter to colour it, and it is then cast into cakes.

After soap has been boiled a sufficient time it is run into a large mould, formed of shallow oblong frames laid one on the other to a height of ten or twelve feet. When the mass is cold and solid these frames are lifted off one by one, leaving the square pillar of soap. Lines are then marked along the sides and ends at an equal distance, and it is then cut into slabs about three inches in thickness by a man pulling a wire through the mass. These are marked on the surface with lines in the same manner, and then cut through with a wire into the bars as sold in the shops.

Soft soap is made by mixing a quantity of oil with the tallow, and boiling it with the whole of the ley necessary at once. The ley is made of potash instead of soda, and the portion of tallow employed prevents the soap from being too soft.

The value of soap depends upon its being easily dissolved in water, and its power of rendering dirt and grease soluble, and therefore easily removed from the clothes that are to be washed.

Washing powders, which are made of some kind of alkali, facilitate the removal of dirt and grease from linen, &c., but they destroy the clothes washed with them by making them tender and easily torn, and should, therefore, be used with great caution.

W J. S.

NEWSPAPERS AND REPORTING.

lo'-cal, <i>relating to a particular place</i>	re-store', <i>to give back, to replace</i>
tel'-e-gram, <i>a message sent by telegraph</i>	pro-pri'-e-tor, <i>an owner</i>
prov'-in-cies, <i>parts of a country at a distance from the capital</i>	in-sert', <i>to put in</i>
phon-o'-graph-y, <i>the art of writing words as they are pronounced, shorthand</i>	pub'-lish, <i>to send forth to the public, to make known</i>
re-vise', <i>to look over a thing the second time</i>	as-so-ci-a'-tion, <i>a number of persons who unite for a special purpose</i>
	un-par'-al-lel-ed, <i>not equalled</i>
	type, <i>the metal casts of letters used in printing</i>

THE first thing that will strike you on taking up a newspaper for the first time, is the great variety of its contents. In it you will see business notices of all kinds; paragraphs containing local news; telegrams about what is going on in other countries and in distant parts of the United Kingdom; accidents in coal mines or on railways; terrible murders; great wars; and all kinds of interesting events, some great and some small, down to the record of 'Births, Marriages, and Deaths.'

Now, how do all these things get into the newspaper so quickly and correctly? That is a question you will have often asked yourself, if you have ever looked into one, and tried to understand it; and that is the question I propose to answer for you in the present lesson.

The notices about matters of business are called 'advertisements,' and generally appear on the first and last pages. They tell you how one person has a house to let; another coals or timber to sell; another a meeting he would like the public to attend; and how another is in want of a situation; or has lost a purse, for which he offers a reward; or has found something, which he would like to restore to its owner. It is an advantage to such persons to have

their advertisements read by those who buy the newspaper; and hence they are glad to pay the proprietor for inserting them. The charge is usually from a shilling to sixpence a line in the great London papers; but in the provinces it ranges from sixpence to a penny, according to the number of times the advertisement is to appear in the paper. If it is to appear only once, the charge is high; if it is to appear often, the charge is low.

The owner of a newspaper thus receives a large sum of money every time his paper is published, on account of these advertisements; but for almost everything else that appears in it, he is called on to pay. Two kinds of news he gets for nothing — the paragraphs, which are cut out of other newspapers, and letters addressed 'To the Editor,' which people of their own accord send to be printed.

The telegraphic news, about events at a distance, costs him a large sum. There are in London great central Press Associations, which have agents almost everywhere, and they collect the news, and supply it to all the newspapers at certain prices, according to the quality and quantity of it. You will sometimes read in the newspaper of things which took place less than two days before in Australia; and you can read every day of things which happened in America only the day before.

But the greater part of the newspaper is generally filled with what is called 'local news,' that is, news about events which happen near the place where the newspaper is published. These events are described by men whose sole business it is to report them. You may have often seen at public meetings, seated near, or on, the platform, a number of gentlemen with note-books, engaged in writing down what is said by the various speakers. They require to be very well educated, to understand all that is said,

and to write an account of it for the newspaper they represent; and they also require to be very rapid writers, as it is sometimes, but not often, necessary to take down every word that is said. They all write shorthand, without which they could not follow the speaker. The quickest longhand writer can seldom write more than forty words a minute; while the average speaker talks at a rate varying from 100 to 180 words a minute. By means of shorthand the reporters manage to keep up with the speaker; and one great reporter, who uses Pitman's system of phonography, has actually written at the unparalleled speed of 200 words a minute.

These reporters having collected during the day a great mass of news, bring it to the office and write it out in longhand for the printers to set up in type. Before this 'copy,' as it is called, is given out to the printers, it is revised, and altered if necessary, by the editor or his sub-editor, who are generally men of more experience than the reporters. The editor, next to the owner of the paper, is the most important person connected with it. To him is entrusted the superintendence of all that goes into the newspaper, except the advertisements, and he is held responsible by the owner for what is done by those under him. If a person wants to get something put into the paper concerning a matter of business, he must take it to the office and pay for it; but if it is not about business, he sends it in the shape of a letter 'To the Editor.' If the editor thinks it will interest or amuse his readers he will insert it; but if it is too long, or dull, or stupid, or badly written, or ungrammatical, he throws it into the waste-paper basket.

The editor also writes what is called the 'leading article' in each paper; and this contains the particular views which the newspaper holds on the

various questions which are reported in its columns. Most of the large London papers, however, have several leading articles upon the various important topics of the day, such as great political or social questions. These are not all written by the same hand, but by different persons, whose special knowledge of the subjects treated of enable them to write with more authority and force upon particular subjects than those less specially qualified. Most of these London dailies, as they are called, continually employ a number of gentlemen to write these articles, either as regular or occasional writers, and these form part of the staff of the paper under the control of the editor. You will find the leading articles almost always worth reading. They are always printed in large type; and if the paper contains eight pages, you will find them on the fourth or fifth; but if it contains only four pages, you will find them on the second.

If the reader of this lesson remembers all these things, she will, perhaps, find the next newspaper she takes up more interesting and more easily understood than before.

T. G. O.

